A Celebration of MFU 25th Anniversary

PACCON

PURE AND APPLIED CHEMISTRY INTERNATIONAL CONFERENCE 2023

20 - 21 January

PROGRAM BOOK

CHEMICAL DIVERSITY TOWARDS SUSTAINABLE DEVELOPMENT GOALS

January 20th - 21st, 2023

E4 Building, Mae Fah Luang University, Chiang Rai

Professor Dr. Her Royal Highness
Princess Chulabhorn Krom Phra Srisavangavadhana

Welcome Message from the President of Mae Fah Luang University

Dear fellow scientists, students, and all participants of the PACCON 2023,

On behalf of Mae Fah Luang University, I would like to welcome you all to the Pure and Applied Chemistry International Conference 2023 or in short, PACCON 2023. This event is held on 20 - 21 January 2023 with the theme of **"Chemical Diversity Towards Sustainable Development Goals"**. Moreover, we are very honored and thankful to our co-host, the Chemical Society of Thailand, for providing us with this wonderful opportunity.

In 2023, it is a special occasion that we will also celebrate the 25th anniversary of Mae Fah Luang University. For the past 25 years, we have produced many high-quality scientific research outputs in Fungal, Natural Products, especially Thai Herb, and Sustainable Materials, from basic research to innovation. We have been ranked as one of the top institutions by Scimago Institutions Rankings (SIR) for many years. In 2022, we have received the honor of being ranked number one in the area of Chemistry in Thailand. (www.scimagoir.com)

PACCON 2023 is a great opportunity for fellow scientists to share and explore - new updates, discoveries, and innovations in the field of chemistry. We believe that everyone attending the PACCON is sharing the same dream and is eager to work together - in achieving a better and more sustainable future. We are honored to have four distinguished plenary lectures: **Prof. Dr. David W.C. MacMillan, Nobel Laureate in Chemistry 2021**, Princeton University, USA; **Prof. Dr. Raymond J. Andersen**, University of British Columbia, Canada, **Prof. Dr. Paul D. Topham**, Aston University, United Kingdom and **Prof. Dr. Purnendu K. Dasgupta**, The University of Texas at Arlington, USA.

I am certain that all participants would receive new knowledge, meet new friends with mutual interests, and valuable new challenges for your field of work. This will definitely create strong collaboration networks. And last but not least, I would like to welcome you all to visit our home in Chiang Rai province - which is enriched in northern Thai-Lanna culture, arts and historical landmarks.

Hope you all the best and see you at Mae Fah Luang University.

Assoc. Prof. Dr.Chayaporn Wattanasiri
President of Mae Fah Luang University

Welcome Message from President of Chemical Society of Thailand

In 2023, the Pure and Applied Chemistry International Conference, known as PACCON will be held at Mae Fah Luang University, Chiang Rai, Thailand during January 20 – 21. The theme for PACCON 2023 is "*Chemical Diversity towards Sustainable Development Goals*". It is undeniable that chemistry has a critical role in achieving sustainable development. Advanced research involves the theme will be displayed at the conference. The PACCON is the annual meeting for Thai chemists to present and share their research. Besides, there will be plenary lectures given by world-renowned chemists, presentations by the Chemical Society of Thailand's awardees, and invited talks by top chemists. In 2023, we have the honor to have the plenary lecture given by a Nobel laureate. The PACCON was started in 2001 by the chemical society of Thailand and became a tradition. An academic institution will in turn co-host the PACCON. I would like to congratulate Mae Fah Luang University, the co-host of PACCON 2023, for its dedication and devotion to making the conference a success. Mae Fah Luang University is world-ranked, and its chemistry research is among the top in Thailand. The venue for the conference will be the university which is well known for its beautiful landscape. Chiang Rai is a city in the north of Thailand. It is rich in culture, and you would be engulfed with northern-style (Lanna) culture and hospitality. Moreover, the city is surrounded by mountains with breathtaking views. The climate of Chiang Rai during the month of January will be the most darling and it is the best time to visit. With all this background and the support from the university, the faculty, and the chemistry department, I wholeheartedly believe that PACCON 2023 will be taken to another level. We are looking forward to seeing you at PACCON 2023. Welcome to Chiang Rai and welcome to PACCON 2023.

Professor Dr. Vudhichai Parasuk
President of Chemical Society of Thailand

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MFU 25th Anniversary

A Leading University in ASEAN

with International Recognition

1

THE Times Higher Education

Number 1 in Thailand for 4 consecutive years (2020-2023)

1 Thailand

THE World University Rankings

1 Thailand

THE Young University Rankings

SCIMAGO INSTITUTIONS RANKINGS

QS STARS™ RATING SYSTEM

4 stars (Overall)

About MFU

15 Academic Schools

Science and Technology Cluster

- School of Science
- School of Information Technology
- School of Cosmetic Science
- School of Agro-Industry

Social Sciences and Humanities Cluster

- School of Liberal Arts
- School of Law
- School of Management
- School of Sinology
- School of Social Innovation

Health Science Cluster

- School of Medicine
- School of Dentistry
- School of Nursing
- School of Health Science
- School of Integrative Medicine
- School of Anti-Aging and Regenerative Medicine

Number of New Students in 2022

Thai 4034

International 369

Number of MFU Alumni

35,773

International Students

5.3%

PLENARY SPEAKERS

Prof. Dr. David W.C. MacMillan
Nobel Laureate in Chemistry 2021
Princeton University,
USA

Prof. Dr. Raymond J Andersen
University of British Columbia,
CANADA

Prof. Dr. Paul D Topham
Aston University,
UNITED KINGDOM

Prof. Dr. Purnendu K. Dasgupta
The University of Texas at Arlington,
USA

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INVITED SPEAKERS

AC - Analytical Chemistry

Prof. Dr. Norio Teshima
Aichi Institute of Technology,
JAPAN

Prof.Dr. Akhmad Sabarudin
Brawijaya University,
INDONESIA

Prof. Dr. Kate Grudpan
Chiang Mai University,
THAILAND

Prof.Dr. Orawon Chailapakul
Chulalongkorn University,
THAILAND

Assoc.Prof.Dr. Awadh O. AlSuhaimi
Taibah University,
SAUDI ARABIA

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INVITED SPEAKERS

AC - Analytical Chemistry

Prof. Dr. Nantanit Wanichacheva
Silpakorn University,
THAILAND

Prof. Dr. Hoeil Chung
Hanyang University,
SOUTH KOREA

Assoc.Prof.Dr. Kontad Ounnunkad
Chiang Mai University,
THAILAND

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INVITED SPEAKERS

CC - Catalytic Chemistry

Prof. Dr. Metta Chareonpanich
Kasetsart University,
THAILAND

Assoc. Prof. Dr. Ekasith Somsook
Mahidol University,
THAILAND

Assoc. Prof. Dr. Shun Nishimura
Japan Advanced Institute of Science and Technology,
JAPAN

Prof. Dr. Jatuporn Wittayakun
Suranaree University of Technology,
THAILAND

Asst. Prof. Chularat Wattanakit
Vidyasirimedhi Institute of Science and Technology (VISTEC),
THAILAND

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INVITED SPEAKERS

CC - Catalytic Chemistry

Prof. Dr. Onder Metin
Koç University,
TURKEY

Prof. Dr. Md. Wahab Khan
Bangladesh University of
Engineering & Technology,
BANGLADESH

Prof. Dr. Joon Ching Juan
University of Malaya,
MALAYSIA

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INVITED SPEAKERS

CE - Chemical Education

Asst. Prof. Dr. Chanyah Dahsah
Srinakharinwirot University,
THAILAND

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INVITED SPEAKERS

EE - Environmental Chemistry and Renewable Energy

Prof. Dr. Perapong Tekasakul
Prince of Songkla University,
THAILAND

Prof. Dr. Kwok Feng Chong
Universiti Malaysia Pahang,
MALAYSIA

Prof. Dr. Wanida Jinsart
Chulalongkorn University,
THAILAND

Assoc. Prof. Dr. Somporn Chantara
Chiang Mai University,
THAILAND

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INVITED SPEAKERS

IC - Inorganic Chemistry

Prof. Dr. Jan J. Weigand
Technical University Dresden,
GERMANY

Assoc. Prof. Dr. David J. Harding
Walailak University,
THAILAND

Prof. Dr. Takumi Konno
National Taiwan Normal University,
TAIWAN
Osaka University,
JAPAN

Prof. Dr. Rei Kinjo
Nanyang Technological University,
SINGAPORE

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INVITED SPEAKERS

IE - Industrial and Engineering Chemistry

Prof. Dr. Sanong Ekgasit
Chulalongkorn University,
THAILAND

Prof. Dr. Chen-Yeon Chu
Feng Chia University,
TAIWAN

Ms. Napaporn Ratanapoka
PTT Global Chemical PCL,
THAILAND

Asst. Prof. Dr. Panate Manomaivibool
Mae Fah Luang University,
THAILAND

Dr. Sumittra Charojrochkul
National Energy Technology Center (ENTEC),
THAILAND

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INVITED SPEAKERS

MN - Material Chemistry and Nanotechnology

Dr. Uracha Ruktanonchai
National Nanotechnology Center (NANOTEC),
THAILAND

Assoc. Prof. Dr. Supree Pinitsoontorn
Khon Kaen University,
THAILAND

Prof. Dr. Fabrice Goubard
Cergy Paris Université,
FRANCE

Assoc. Prof. Dr. Olivier Fontaine
Vidyasirimedhi Institute of Science and Technology (VISTEC),
THAILAND

Prof. Dr. David Jenkins
The University of Tennessee,
USA

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INVITED SPEAKERS

MN - Material Chemistry and Nanotechnology

Prof. Dr. Hirotomo Nishihara
Tohoku University,
JAPAN

Assoc. Prof. Dr. Tetsuro Kusamoto
Institute for Molecular Science,
JAPAN

Prof. Song Jung-il
Changwon National University,
SOUTH KOREA

Prof. Dr. Pierre-Hensri Aubert
Cergy Paris Université,
FRANCE

Prof. Dr. Mustafa Culha
Augusta University,
USA

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INVITED SPEAKERS

MN - Material Chemistry and Nanotechnology

Assoc. Prof. Dr. Philippe Banet
Cergy Paris Université,
FRANCE

Assoc. Prof. Dr. Prasopchai Patrojanasophon
Silpakorn University,
THAILAND

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INVITED SPEAKERS

NP - Natural Products, Biological Chemistry and Chemical Biology

Prof. Dr. Marc Stadler
Helmholtz Centre for Infection Research,
GERMANY

Prof. Dr. Dev P. Arya
Clemson University,
USA

Prof. Dr. Wim Vanden Berghe
University of Antwerp,
BELGIUM

Prof. Dr. Chatchai Muanprasat
Mahidol University,
THAILAND

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INVITED SPEAKERS

OM - Organic Synthesis and Medicinal Chemistry

Prof. Dr. Oliver Reiser
University of Regensburg,
GERMANY

Prof. Dr. Sunkyu Han
Korea Advanced Institute of Science and Technology (KAIST),
KOREA

Prof. Dr. Teck Peng Loh
Nanyang Technological University,
SINGAPORE

Prof. Dr. Reuben Jih-Ru Hwu
National Tsing Hua University,
TAIWAN

Dr. Poonsakdi Ploypradith
Chulabhorn Research Institute,
THAILAND

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INVITED SPEAKERS

PC - Polymer Chemistry and Bio-based Materials

Prof. Dr. Brian Tighe
Aston University,
UNITED KINGDOM

Prof. Dr. Lisbeth Grondahl
University of Queensland,
AUSTRALIA

Prof. Dr. Hu Xiao
Nanyang Technological University,
SINGAPORE

Prof. Dr. Jitladda Sakdapipanich
Mahidol University,
THAILAND

Assoc. Prof. Dr. Daniel Crespy
Vidyasirimedhi Institute of Science and Technology (VISTEC),
THAILAND

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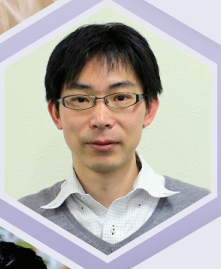
INVITED SPEAKERS

PT - Physical and Theoretical Chemistry

Prof. Dr. Guenter Grampp
Graz University of Technology,
AUSTRIA



Prof. Dr. Yasuteru Shigeta
University of Tsukuba,
JAPAN

Prof. Dr. Deva Priyakumar
International Institute of Information Technology,
INDIA

Prof. Dr. Alexander Kuhn
University of Bordeaux,
FRANCE

Prof. Dr. Alessandro Fortunelli
National Research Council (CNR),
ITALY

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INVITED SPEAKERS

PT - Physical and Theoretical Chemistry

Dr. Kaito Takahashi
Institute of Atomic and Molecular Sciences,
TAIWAN

Prof. Dr. Hidehiro Sakurai
Osaka University,
JAPAN

Assoc. Prof. Dr. Suwat Nanan
Khon Kaen University,
THAILAND

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CST AWARDEES 2022

CST Distinguished Chemist Award 2022 (Physical Chemistry)

Prof. Dr. Sanong Ekgasit

Chulalongkorn University

CST Distinguished Young Chemist Award 2022 (Analytical Chemistry)

Asst. Prof. Dr. Itthipon Jeerapan

Prince of Songkla University

CST Award for Distinguished Contribution to Chemical Education 2022

Assoc. Prof. Dr. Taweetham Limpanuparb

Mahidol University International Collage

Wiley-CST Award for Contribution to Green Chemistry 2022

Dr. Teera Butburee

National Nanotechnology Center

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CST AWARDEES 2022

Shimadzu-CST Young Chemist Award 2022

Asst. Prof. Dr. Anyanee Kamkaew
Suranaree University of Technology

Merck-CST Distinguished Dissertation Award 2022

Dr. Tammanoon Chankhanittha
Khon Kaen University

Metrohm-CST Young Chemist Award 2022

Mr. Keerakit Kaewket
Suranaree University of Technology

DOW-CST Award for Distinguished School Science Teacher 2022 (Lower Secondary Education)

Mr. Patiyan Jitludda
Chiangrai Provincial Administrative Organization School

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CST AWARDEES 2022

DOW-CST Award for Distinguished School Science Teacher 2022 (Upper Secondary Education)

Mrs. Narumon Pakkaratho

Siyanuson School

Merck-CST-TYCN for Sustainable Future Award 2022

Chayasith Uttamapinant

Vidyasirimedhi Institute of Science and Technology

SMALL-SCALE CHEMISTRY TEACHERS NETWORKING

Mr. Robert Worley

CLEAPPS,
UNITED KINGDOM

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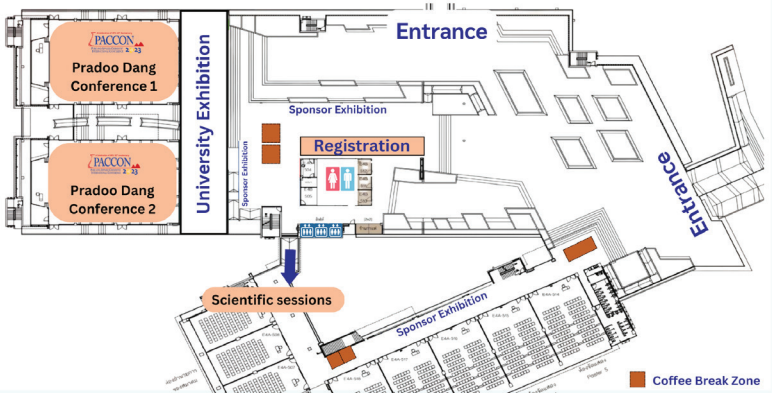
CONFERENCE VENUE AND FLOOR PLAN

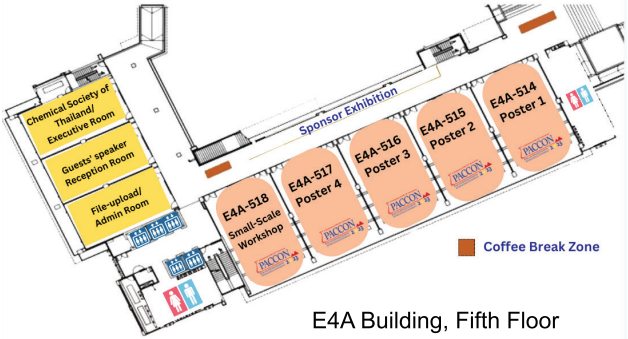
MFU Map

1. **M-Square Building**
   - L-Park (Lifestyle Park)
     - Bistro/ Convenience Store
   - I-Park (Innovation Park)
     - PACCON Lunch Zone E
     - MFU Post Office
   - E-Park (Education Zone)
     - Fifth Floor
       - PACCON Lunch Zone A-C, F-G
     - Third Floor
       - PACCON Lunch Zone D
2. **E4 Building**
   - The Pure and Applied Chemistry International Conference
   - PACCON Opening & Closing ceremony
3. **Area in front of HRH Princess Srinagarindra Statue**
   - PACCON Conference's banquet

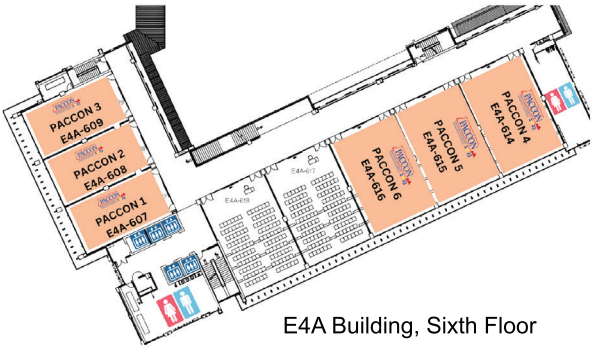


E4B Building, Fifth Floor

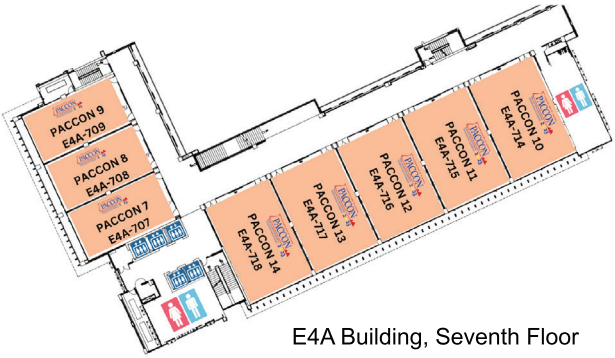
CONFERENCE VENUE AND FLOOR PLAN



E4A Building, Fifth Floor



E4A Building, Sixth Floor



E4A Building, Seventh Floor

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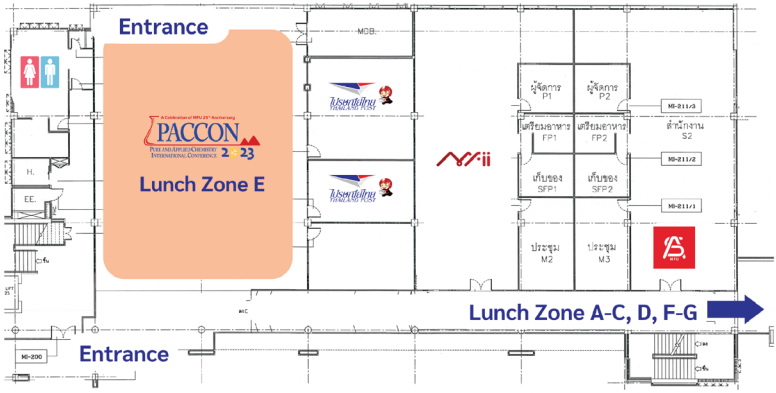
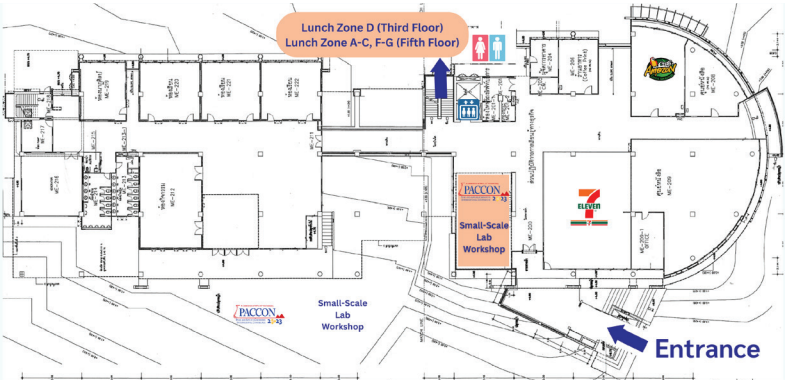
CONFERENCE VENUE AND FLOOR PLAN

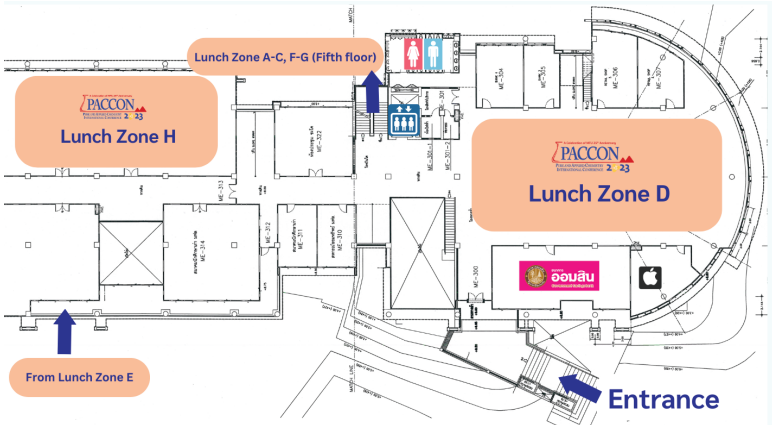


M-Square, I-Park Building; Second Floor

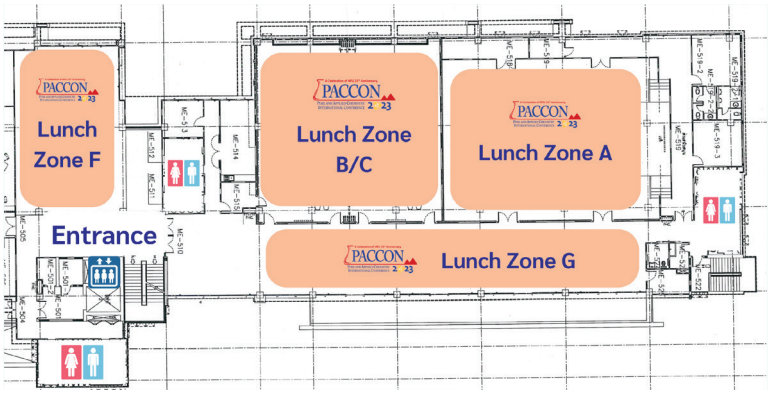


M-Square, E-Park Building; Second Floor

CONFERENCE VENUE AND FLOOR PLAN



M-Square, E-Park Building; Third Floor



M-Square, I-Park Building; Fifth Floor

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PACCON2023 PROGRAM

Time	19 January 2023		Time	20 January 2023	Time	21 January 2023
08.00			08.00	**Registration PACCON2023 (General Sampao Chusri Building: E4)**	09.00	**Oral Presentation** (General Sampao Chusri Building: E4 Floor 6-7) **Thailand Younger Chemists Network (TYCN)** (General Sampao Chusri Building: E4 Pradoo dang Meeting Room 1) **Small-scale Chemistry Teachers Networking** (General Sampao Chusri Building: E4, room E4-518)
			09.15	**All Participants move to Main Auditorium: C4**		
09.00	The Federation of Asian Chemical Societies Executive Committee (FACS EXCO) Meeting Doitung Meeting Room (AD1) Coffee Break (10:30-10:45)		09.30	Grand Opening Ceremony by Mae Fah Luang University President Main Auditorium: C4		
			10.00	Chair: Prof. Dr. Somdej Kanokmedhakul **Plenary Speaker: Prof. Dr. Raymond J. Andersen** Topic: Natural Product Drug Leads for Development of 'Host Directed Therapies' to Manage 21st Century Pandemics Main Auditorium: C4		
			10.50	Coffee Break (LanDao)	10.30	Coffee Break
			11.10	Chair: Assoc. Prof. Dr. Jaroon Jakmunee **Plenary Speaker: Prof. Dr. Purnendu K. Dasgupta** Topic: Absorbance Detection in HPLC: The Dilemma between Sensitivity and Resolution Main Auditorium: C4	10.45	**Oral Presentation** (General Sampao Chusri Building: E4 Floor 6-7)
12.00	**Lunch**					
13.00-16.15	**Registration PACCON2023 (General Sampao Chusri Building: E4)**					
13.00	The Federation of Asian Chemical Societies Executive Committee (FACS EXCO) Meeting (Continue) Doitung Meeting Room (AD1)	Chemical Society of Thailand (CST) and Head of Chemistry Department Meeting Chiang San Meeting Room (AD1)	13.00	**Poster Presentation (All Sessions)** (General Sampao Chusri Building: E4, room E4A 514-517)	13.00	**Oral Presentation** (General Sampao Chusri Building: E4 Floor 6-7) **Thailand Younger Chemists Network (TYCN)** (General Sampao Chusri Building: E4 Pradoo dang Conference 1)
15.00	Coffee Break		15.00	Coffee Break		Coffee Break
15.15	The Federation of Asian Chemical Societies Executive Committee (FACS EXCO) Meeting (Continue) Doitung Meeting Room (AD1)	Chemical Society of Thailand (CST) and Head of Chemistry Department Meeting (Continue) Chiang San Meeting Room (AD1)	15.15	**Oral Presentation** (General Sampao Chusri Building: E4, Floor 6-7)	15.00	**All Participants move to Main Auditorium: C4**
			16.30	**All Participants move to Main Auditorium: C4**	15.15	Chair: Prof. Dr. Tirayut Vilaivan **Plenary Speaker: Prof. Dr. David W.C. MacMillan (Nobel Laureate in Chemistry 2021)** Topic: Development of Asymmetric Organocatalysis and Metallaphotoredox Main Auditorium: C4
			16.45	Chair: Prof. Dr. Vinich Promarak **Plenary Speaker: Prof. Dr. Paul D. Topham** Topic: Polymer Design for Sustainable Materials of the Future Main Auditorium: C4	16.30	**Conference Closing Ceremony** Main Auditorium: C4
18.00-20.00	**Welcome Reception** for FACS, CST and Head of Chemistry Department (Phuphan Restaurant)		18.00-20.00	**Conference Banquet** (Area in front of HRH Princess Srinagarindra Statue)	18.00-20.00	**Appreciation Party** for Plenary Speakers/Invited Speakers/ Chair/Co-chair (The Riverie Chiangrai Hotel)

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PROGRAM AT A GLANCE

20 Jan 2023														
Time	**PACCON 1 E4A-607**	**PACCON 2 E4A-608**	**PACCON 3 E4A-609**	**PACCON 4 E4A-614**	**PACCON 5 E4A-615**	**PACCON 6 E4A-616**	**PACCON 7 E4A-707**	**PACCON 8 E4A-708**	**PACCON 9 E4A-709**	**PACCON 10 E4A-714**	**PACCON 11 E4A-715**	**PACCON 12 E4A-716**	**PACCON 13 E4A-717**	**PACCON 14 E4A-718**
08.00-09.15	Registration PACCON2023													
09.15-09.30	All Participants move to C4													
09.30-10.00	Grand Opening Ceremony by Mae Fah Luang University President (Main Auditorium: C4)													
10.00-10.50	Plenary Speaker: Prof. Dr. Raymond J. Andersen (Main Auditorium: C4)													
10.50-11.10	Coffee break													
11.10-12.00	Plenary Speaker: Prof. Dr. Purnendu K. Dasgupta (Main Auditorium: C4)													
12.00-13.00	Lunch													
13.00-15.00	Poster Presentation (General Sampao Chusri Building: E4 room E4A 514-517) (All Sessions)													
15.00-15.15	Coffee break													
15.15-15.45		NP-I-079	OM-I-007			PC-I-060		PT-I-039		AC-I-108		MN-I-072	MN-I-062	
15.45-16.00		NP-O-066	OM-O-050			PC-O-002		PT-O-018		AC-I-018		MN-O-015	MN-O-029	
16.00-16.15		NP-O-043	OM-O-004			PC-O-007		PT-O-034				MN-O-017	MN-O-068	
16.15-16.30		NP-O-076	OM-O-035					PT-O-023		AC-O-024			MN-O-063	
16.30-16.45	All Participants move to Main Auditorium: C4													
16.45-17.35	Plenary Speaker: Prof. Dr. Paul D. Topham (Main Auditorium: C4)													
18.00-20.00	Conference Banquet (Area in front of HRH Princess Srinagarindra Statue)													

PROGRAM AT A GLANCE

21 Jan 2023														
Time	**PACCON 1 E4A-607**	**PACCON 2 E4A-608**	**PACCON 3 E4A-609**	**PACCON 4 E4A-614**	**PACCON 5 E4A-615**	**PACCON 6 E4A-616**	**PACCON 7 E4A-707**	**PACCON 8 E4A-708**	**PACCON 9 E4A-709**	**PACCON 10 E4A-714**	**PACCON 11 E4A-715**	**PACCON 12 E4A-716**	**PACCON 13 E4A-717**	**PACCON 14 E4A-718**
08.30-09.00				CC-I-044	CC-I-017			PT-I-033	PT-I-040	AC-I-066	AC-I-107			
09.00-09.30	IC-I-001	NP-I-023	OM-I-040	CC-I-041	CC-I-002	PC-I-036	IE-I-014	PT-I-001	PT-I-002	CST Distrin-guished Young Chemist Award 2022	AC-I-109	MN-I-056	MN-I-049	EE-I-046
09.30-09.45	IC-I-016	NP-O-049	OM-I-052	CC-O-033	CC-O-006	PC-O-012	IE-O-003	PT-O-009	PT-O-007	AC-I-054	AC-O-034	MN-I-013	MN-I-032	EE-I-042
09.45-10.00		NP-O-033		CC-O-030	CC-O-020	PC-O-019	IE-O-004	PT-O-013	PT-O-008		AC-O-076			
10.00-10.15	IC-O-006	NP-O-011	OM-O-014	CC-O-025	CC-O-027	PC-O-030	IE-I-002	PT-O-006	PT-O-019	AC-O-002	AC-O-063	MN-O-061	MN-O-001	EE-O-014
10.15-10.30	IC-O-009	NP-O-021	OM-O-017	CC-O-011	CC-O-028	PC-O-005				AC-O-047		MN-O-047	MN-O-055	EE-O-009
10.30-10.45	Coffee break													
10.45-11.00	IC-I-005	NP-I-003	OM-I-051	CC-I-042	CC-I-045	PC-I-037	IE-I-013	PT-I-005	CE-I-014	AC-I-106		MN-I-025	MN-I-048	EE-I-043
11.00-11.15														
11.15-11.30	IC-O-010	NP-O-031	OM-O-027	CC-O-040	CC-O-010	PC-O-017	IE-O-001	PT-O-026	CE-O-001	AC-O-043		MN-O-040	MN-O-046	EE-O-002
11.30-11.45	IC-O-019	NP-O-010	OM-O-010		CC-O-021	PC-O-026	IE-O-005	PT-O-024	CE-O-015	AC-O-051		MN-O-014	MN-O-065	EE-O-010
11.45-12.00	IC-O-020	NP-O-024	OM-O-023	CC-O-009	CC-O-039	PC-O-016			FA-O-005	AC-O-057		MN-O-037	MN-O-053	EE-O-028
12.00-13.00	Lunch													
13.00-13.30	IC-I-013	NP-I-009	OM-I-049	CC-I-043		PC-I-055	IE-I-018	PT-I-049		AC-I-085		MN-I-008	MN-I-028	EE-I-045
13.30-13.45	IC-O-023	NP-O-065	OM-O-012	CC-I-034		PC-I-038	IE-O-007	PT-I-036		AC-O-059		MN-I-009	MN-I-002	EE-O-035
13.45-14.00	IC-O-011	NP-O-032	OM-O-011				IE-O-010			AC-O-028				EE-O-034
14.00-14.15	IC-O-014	NP-O-038	OM-O-013	CC-O-005		PC-O-025	IE-I-017	PT-O-038		AC-O-058		MN-O-030	MN-O-011	EE-O-017
14.15-14.30				CC-O-031		PC-O-046		PT-O-041		AC-O-075		MN-O-016	MN-O-039	
14.30-14.45				CC-O-038		PC-O-013	IE-O-011			AC-O-072				
14.45-15.00				CC-O-008		PC-O-027	IE-O-012							
15.00-15.15	Coffee break and All Participants move to Main Auditorium: C4													
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)													
16.30-17.30	Closing Ceremony													
18.00-20.00	Appreciation Party for Plenary Speakers/Invited Speakers/Chair/Co-chair (The Riverie Chiangrai Hotel)													

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SESSION SUMMARY

Abbreviation of Scientific Session and Presentation

AC	Analytical Chemistry
CC	Catalytic Chemistry
CE	Chemical Education
EE	Environmental Chemistry and Renewable Energy
FA	Food and Agricultural Chemistry
IC	Inorganic Chemistry
IE	Industrial and Engineering Chemistry
MN	Material Chemistry and Nanotechnology
NP	Natural Products, Biological Chemistry and Chemical Biology
OM	Organic Synthesis and Medicinal Chemistry
PC	Polymer Chemistry and Bio-based materials
PT	Physical and Theoretical Chemistry
PL	Plenary Lecturer
IV	Invited Lecturer
CST	Chemical Society of Thailand Awardees' Lecture
SSCTN	Small-scale Chemistry Teachers Networking
TYCN	Thailand Younger Chemists Network
O	Oral Presentation
P	Poster Presentation

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SESSION SUMMARY

Scientific Sessions

AC	**Analytical Chemistry**
Chair:	Assoc. Prof. Dr. Jaroon Jakmunee
Co-Chair:	Dr. Kanchana Watla-iad Dr. Korbua Chaisiwamongkhol
CC	**Catalytic Chemistry**
Chair:	Prof. Dr. Suttichai Assabumrungrat
Co-Chair:	Dr. Prachak Inkaew Dr. Prathak Jienkulsawad
CE	**Chemical Education**
Chair:	Assoc. Prof. Dr. Ekasith Somsook
Co-Chair:	Asst. Prof. Dr. Acharavadee Bunkoom
EE	**Environmental Chemistry and Renewable Energy** Sub-Sessions: EE1 - Environmental Process EE2 - Atmospheric Chemistry EE3 - Ecotoxicity EE4 - Other Environmental and Renewable Energy fields
Chair:	Prof. Dr.Perapong Tekasakul
Co-Chair:	Dr.Tharakorn Maneerat Asst. Prof. Dr. Khamphe Phoungthong

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SESSION SUMMARY

Scientific Sessions *(Cont'd)*

FA	**Food and Agricultural Chemistry** Sub-Sessions: FA1 - Major and Minor Components of Food, their nutrition, Sensory, and Flavour FA2 - Antioxidants, Phytochemicals, and Botanicals FA3 - Chemistry of Food Additives, Contaminants, Agro-chemicals, and Toxicology
Chair:	Assoc. Prof. Dr. Manat Chaijan
Co-Chair:	Assoc. Prof. Dr. Patcharee Pripdeevech Assoc. Prof. Dr. Saroat Rawdkuen
IC	**Inorganic Chemistry**
Chair:	Prof. Dr. Thawatchai Tuntulani
Co-Chair:	Dr. Thitipone Suwunwong
IE	**Industrial and Engineering Chemistry** Sub-Sessions: IE1 - Advanced Bioenergy IE2 - Chemistry Innovation for Sustainable Waste Management IE3 - Energy for the Sustainable Future IE4 - Other Industrail and Engineering Field
Chair:	Assoc. Prof. Dr. Darunee Vattanasiriwech
Co-Chair:	Asst. Prof. Dr. Chuleeporn Thanomsilp Asst. Prof. Dr. Pannipha Dokmaingam
MN	**Material Chemistry and Nanotechnology**
Chair:	Prof. Dr. Vinich Promarak
Co-Chair:	Assoc. Prof. Dr. Orawan Suwantong Asst. Prof. Dr. Nattakan Soykeabkaew

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SESSION SUMMARY

Scientific Sessions *(Cont'd)*

NP	**Natural Products, Biological Chemistry and Chemical Biology** Sub-Sessions: NP1 - Natural Products, Isolation, Structural elucidation, Biological Activities, and Synthesis NP2 - Herbal Medicine, and Cosmetic Chemistry NP3 - Biological Chemistry and Chemical Biology: Computational Chemistry, Synthesis, Drug Design, Molecular Biology, and Function of Natural Products at the Chemistry-Biology Interface NP4 - Related fields
Chair:	Prof. Dr. Vatcharin Rukachaisirikul
Co-Chair:	Assoc. Prof. Dr. Surat Laphookhieo
OM	**Organic Synthesis and Medicinal Chemistry**
Chair:	Prof. Dr. Tirayut Vilaivan
Co-Chair:	Assoc. Prof. Dr. Kwanruthai Tadpetch
PC	**Polymer Chemistry and Bio-based materials** Sub-Sessions: PC1 - Polymers for Sustainable Society PC2 - Polymers for Health PC3 - Rubbers and Elastomers PC4 - Advanced Polymers and Nanopolymers PC5 - Polymer Technology and Innovation PC6 - Polymer Characterization and Structural Analysis
Chair:	Prof. Dr. Suwabun Chirachanchai
Co-Chair:	Asst. Prof. Dr. Patchara Punyamoonwongsa Assoc. Prof. Dr. Orawan Suwantong
PT	**Physical and Theoretical Chemistry**
Chair:	Prof. Dr.Siriporn Jungsuttiwong
Co-Chair:	Dr. Patcharanan Choto

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PLENARY LECTURE ABSTRACTS

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PL-I-001

Development of asymmetric organocatalysis and metallaphotoredox

David W. C. MacMillan[1]*
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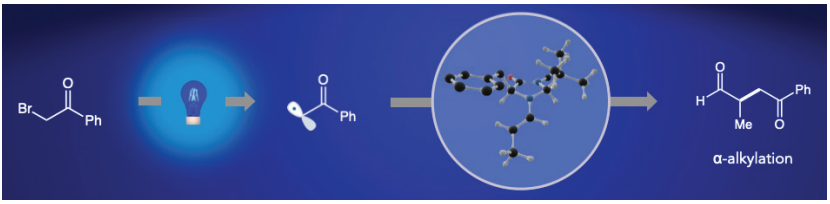
**E-mail: dmacmill@princeton.edu*

This lecture will first discuss the advent of organocatalysis in my laboratory. As part of this overview, we will highlight why organic catalysts have become widely explored in modern synthetic chemistry. This lecture will also discuss the application of visible light photocatalysis to the discovery or invention of transformations that will be conceptually or synthetically valuable (and sometimes, hopefully, both). We will describe why a healthy balance of reaction discovery and mechanistic understanding has been important to the development of a field of research that is now being widely adopted in both industrial and academic settings. In particular, we will discuss the application of photocatalysis to the development of new metallaphotoredox reactions involving copper, a development that we hope will have an impact on the discovery of new biologically relevant molecules. Finally, we will examine an exciting recent application of photoredox catalysis in my group; namely, the high-resolution μMap technology, which provides a powerful means to probe biological pathways at the subcellular level.

Keywords: organocatalysis; metallaphotoredox; proximity labeling



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PL-I-001

David W. C. MacMillan

Dave MacMillan was born in Bellshill, Scotland, and received his undergraduate degree in chemistry at the University of Glasgow, where he worked with Dr. Ernie Colvin. In 1990, he began his doctoral studies under the direction of Professor Larry Overman at the University of California, Irvine, before undertaking a postdoctoral position with Professor Dave Evans at Harvard University. He began his independent career at University of California, Berkeley, in 1998 before moving to Caltech in 2000. In 2006, MacMillan moved to Princeton University, where he is currently James S. McDonnell Distinguished University Professor of Chemistry. MacMillan is a member of the National Academy of Sciences, a Fellow of the Royal Society, and a Fellow of the American Academy of Arts and Sciences. Dave shares the 2021 Nobel Prize in Chemistry with Benjamin List "for the development of asymmetric organocatalysis."

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PL-I-002

Natural product drug leads for development of 'Host Directed Therapies' to manage 21st Century Pandemics

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**E-mail: raymond.andersen@ubc.ca*

The focus of research conducted in our group at UBC is to discover novel biologically active natural products that can be used as tools to identify new drug targets or as lead compound inspiration for drug development. Recently we have focused our drug discovery efforts on HIV-1/AIDS, SARS-CoV-2 (COVID-19), and tuberculosis, three 21st Century Pandemics caused by viral or bacterial infections. The lecture will focus on novel marine sponge and microbial natural products discovered by our group that have been used as i) tool compounds to identify a new cellular drug target for the development of 'host-directed therapies' for treatment of tuberculosis and ii) that represent lead compounds for development of 'host-directed therapies' with novel mechanisms of action to treat HIV-1 and COVID infections. An example of a sponge natural product discovered by our group that has been employed as the warhead of a novel antibody drug conjugate that is in clinical trials for treatment of ovarian cancer will also be presented.

Keywords: marine; natural product; drugs; COVID; tunerculosis

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PL-I-002

Raymond Andersen

BSc in Chemistry, University of Alberta, Edmonton; MSc in Chemical Physics, University of California, Berkeley; PhD in Marine Natural Products Chemistry, University of California, San Diego (D.J. Faulkner, supervisor); Postdoctoral Fellow, Synthetic Natural Products Chemistry, MIT, Cambridge (G. Buchi, supervisor); Professor of Chemistry and Earth Ocean & Atmospheric Science, University of British Columbia, Vancouver, BC, Canada.

Awards: Merck Sharp and Dohme Lecture Award, Chemical Institute of Canada; UBC Killam Research Prize; Fellow - Chemical Institute of Canada; Rutherford Medal in Chemistry - Royal Society of Canada; Fellow - Royal Society of Canada; Arthur E. Schwarting Award, American Society of Pharmacognosy; UBC Killam Graduate Teaching Prize; R.U. Lemieux Award, Canadian Society for Chemistry; Jacob Biely Research Prize, UBC; Paul J. Scheuer Award in Marine Natural Products Chemistry; Chemical Institute of Canada Medal; Fellow - American Society of Pharmacognosy; Norman R. Farnsworth Research Achievement Award, American Society of Pharmacognosy.

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PL-I-003

Absorbance detection in chromatography: The dilemma between sensitivity and resolution

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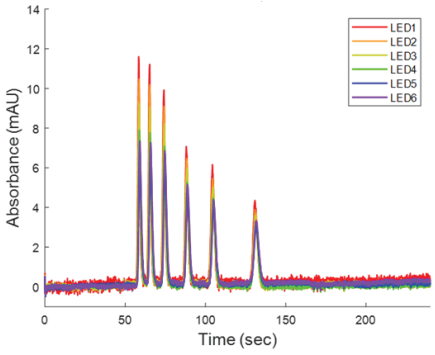
At the present time, high performance liquid chromatography (HPLC) is the most widely used instrumental technique used for chemical analysis. The absorption of radiation in the UV-Visible region is the most common detection approach used therein. Optical absorbance increases in direct proportion to the path length over which light absorption is measured, thus increasing detection sensitivity. Attainable limit of detection, depends, however, on noise, which increases as the path length increases because light throughput decreases. The optimum path length from S/N considerations is attained at a length of $2/\alpha$ where α is the light attenuation coefficient of the absorption cell, filled with the background medium. In most cases this value is typically far longer than what is used in HPLC detection. The reason has little to with detection considerations. A greater path length also results in a larger cell volume, which results in greater dispersion, in turn deteriorating chromatographic resolution. If dispersion in the cell happens primarily due to hydrodynamic reasons and not molecular diffusion, it is potentially possible to correct for the dispersion by applying what has been learned from the behavior of one set of compounds under both short and long cell conditions. Thereafter one would operate with a long cell to take advantage of the greater S/N but mathematically transform the data to short cell conditions to get greater resolution. Would it be possible to do this for columns in the obverse, i.e., take short column data and project what one would get in a longer column?

Keywords: HPLC; Absorbance detection; resolution



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PL-I-003

Purnendu K. (Sandy) Dasgupta

Born in Kolkata, India, he received his PhD degree in Analytical Chemistry with a minor in Electrical Engineering from Louisiana State University in 1977. Following three years at the California Primate Research Center (University of California at Davis), he spent twenty-five years at Texas Tech University, where he was the Paul Whitfield Horn Distinguished Professor. He has been at the University of Texas at Arlington since 2007 and currently holds the Hamish Small Chair in ion analysis. Dasgupta is the author of more than 450 papers in peer-reviewed journals in analytical and environmental chemistry. He holds 40 US patents, many of which has been commercialized. His research interests broadly underlie theory and practice of chemical instrumentation. He received American Chemical Society (ACS) Award in Chemical Instrumentation, Texas Distinguished Scientist Award, Talanta Gold Medal Award in Analytical Chemistry, ACS Award in Chemical Education, ACS award in Chromatography, etc.

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PL-I-004

Polymer Design for Sustainable Materials of the Future

Paul D Topham
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Climate change is the most pressing issue of our time. It is happening at an alarmingly fast pace. However, we are not powerless in the face of this global threat, but we need to act now. The problem is multi-faceted and will require action by multiple parties, from policymakers to consumers. Scientists play a pivotal role in this huge challenge, with the ability to create advanced processes, technologies, and materials.

A key component of the solution is the use of polymer materials (often referred to as plastics), which can be made by energy-efficient processes and designed to have a wide range of properties for a plethora of applications. The advantages of plastics are clear. Plastics alone save over 500 million GJ of energy per year owing to their superior properties over other materials. However, of the (more than) 8 billion metric tons of plastics that have been produced globally, only approximately 9% have been recycled, with over 6 billion metric tons of plastic waste being generated over the years. This is a problem that must be addressed if we are to truly exploit the potential of polymers in tackling the global crisis of climate change.

In this talk, we will explore the essential aspects of future material design, looking at molecular design principles, appropriate feedstocks, digitalization and life-cycle analysis.

Keywords: polymers; plastics; materials design; chemistry; molecular engineering

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PL-I-004

Professor Paul D. Topham

Professor Paul D Topham (CChem FRSC SFHEA) is a Full Professor of Polymer Science and Head of School of Infrastructure and Sustainable Engineering (ISE) at Aston University, joining as a Lecturer in 2008. Since his first contribution to science in 2005, he has published 107 research papers, 1 filed patent and 3 invited book chapters. Since starting at Aston, he has been awarded several grants as PI and CoI (including x-ray and neutron beamtime at international radiation facilities) totalling over £6.3million, and is the Secretary of the Polymer Division of the International Union of Pure and Applied Chemistry (IUPAC)- the equivalent of the United Nations for Chemistry. In 2019, he was awarded the prestigious position of representing Hydrogen in the Periodic Table of Younger Chemists for the celebration of IUPAC100 and IYPT: https://iupac.org/100/pt-of-chemist/, was also the MacroGroup UK Young Researchers Medal 2014 recipient, is a Visiting Professor of the South China University of Technology, a Senior Fellow of the Higher Education Academy (SFHEA) and a former member of the Soft Matter Panel for the Diamond Light Source. He is the Coordinator of a Horizon2020 project (ca. £1.1 million) working with Universities in Thailand and the Czech Republic alongside a company in Spain and was previously the Vice-Coordinator of a large FP7-funded consortium (11 European partners, ca. 4 million euros).

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INVITED SPEAKER ABSTRACTS

AC

Analytical Chemistry

AC-I-018

Exploring diverse analytical methods for identification of gallbladder cancer using bile as a specimen

Eunjin Jang, Woosuk Sohng, Hoeil Chung*
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Bile juice, an aqueous sample containing various metabolic components such as bile salts, fatty acids, cholesterol, proteins, phospholipids, and bilirubin (total concentration of the metabolites: approximately 15%), is a useful and most informative specimen since its composition potentially varies depending on gallbladder (GB) pathological conditions. So, bile juice can be a versatile specimen for spectroscopy-based diagnosis of diverse GB-related diseases. With this motivation, diverse spectroscopic tools such as IR, NIR, SERS, LIBS, and mass spectrometry were employed for the analysis of bile samples and the discriminability of GB cancer in each case was evaluated. Also, the pros and cons of these methods will be discussed.

Keywords: bile juice; gall bladder cancer; IR/NIR spectroscopy; LIBS; mass spectrometry

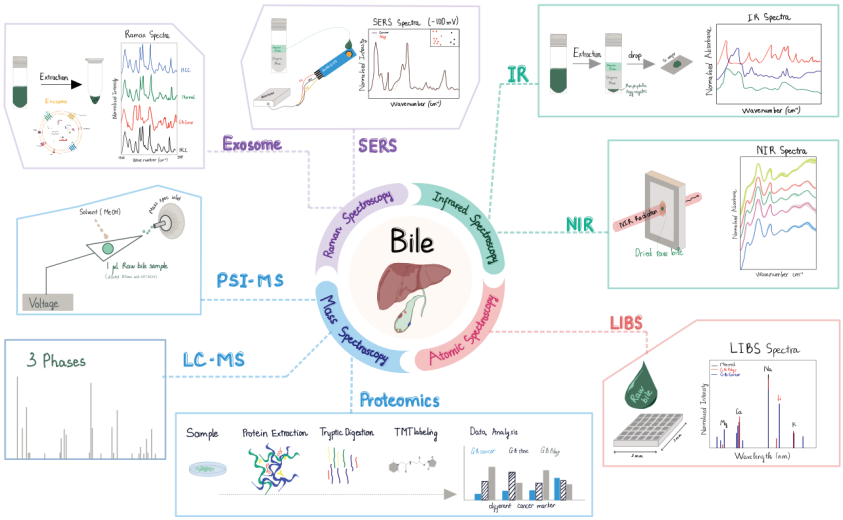

Figure 1. Overall scheme for the analysis of bile juice to identify gall bladder cancer using IR, NIR, Raman, LIBS, and mass spectrometry

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AC-I-018

Hoeil Chung

Hoeil Chung is a Professor in the Department of Chemistry in Hanyang University, Seoul, Korea. He obtained his B.S. from Hanyang University in 1989 and Ph.D. from the University of Iowa in 1994. Right after obtaining his Ph.D., he joined SK Energy (formerly Yukong) in Korea as a research scientist and was involved in projects for developing diverse near-infrared (NIR) spectroscopic systems for on-line monitoring of refinery and petrochemical processes; for example, gasoline blending and naphtha reforming. In 2002, he joined Hanyang University and started his academic research in the areas of transmission/wide area coverage Raman spectroscopy for non-destructive analysis, reproducible and reusable SERS schemes to detect disease biomarkers, electrochemical synthesis of metal–alloy nanostructures and development of advanced chemometric algorithms. He has published more than 200 papers in peer-reviewed journals and has presented them at many international conferences.

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AC-I-054

Nanomaterial-mediated paper-based analytical devices for disease detection

Akhmad Sabarudin[1]*, Noval Dwi Wijaya[1], Baiq Emalia Pebriatin[1], Setyawan Purnomo Sakti[2], Aulanni'am[1], Hani Susianti[3], Nur Samsu[4], Agus Naba[2], Ika Oktavia Wulandari[1], Yudit Oktanella[5], Dewi Anggraeni[2]

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[2]*Department of Physics, Faculty of Science, Brawijaya University, Indonesia*
[3]*Department of Clinical Pathology, Faculty of Medicine, Brawijaya University, Indonesia*
[4]*Department of Internal Medicine, Faculty of Medicine, Brawijaya University, Indonesia*
[5]*Department of Animal Reproduction, Faculty of Veterinary Medicine, Brawijaya University, Indonesia*
**E-mail: sabarjpn@ub.ac.id*

The World Health Organization (WHO) has set 7 guidelines for developing a diagnostic tool; Affordable, Sensitive, Specific, User-friendly, Rapid and Robust, Equipment-free, and Delivered to those who need it (ASSURED). This means it is highly desirable to use simple point-of-care testing (POCT) for the detection of diseases that the general public can use. This requirement can be achieved using paper-based analytical devices (PADs). This promising analytical platform satisfies a combination of portability, easy-to-use, low cost, and reliability for the rapid detection of disease. Currently, the use of nanomaterials on PADs has been growing rapidly because these materials are able to change and/or amplify colorimetric signal readout so that the analytical results can be easily observed by the naked eye. In this work, we will discuss the rapid detection of biomarkers for kidney disease and diabetes mellitus by employing gold and silver nanoparticles and in-situ synthesis of nanoparticles on paper substrates/PADs for quantitative/semiquantitative albumin-to-creatine ratio and non-enzymatic glucose determinations.

Keywords: nanomaterials; rapid detection; paper-based devices; albumin-to-creatine ratio; glucose

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AC-I-054

Akhmad Sabarudin

Akhmad Sabarudin is currently head of Research Center for Advanced System and Material Technology of Brawijaya University, Indonesia. He received Dr.Sc degree (2007) in Analytical Chemistry from Okayama University, and spent 2 years as JSPS Postdoctoral Fellowship at EcoTopia Science Institute (nanomaterial division) of Nagoya University (2010-2012). He received several scientific awards from Japan Society for Analytical Chemistry, Japan Association for Flow Injection Analysis, Ministry of National Education of Indonesia. His research interests include developing monolithic chromatography for the separation of biomolecules and enantiomers, preparation of nanomaterials for bioanalytical applications, development of solid-phase extraction, flow-based analytical methods, and rapid detection devices for analytical and bioanalytical applications.

AC-I-085

Visible and near infrared hazardous ion sensors and strategies to improve visualization and fluorescent sensitivity

Nantanit Wanichacheva[1,*], Pattanawit Swanglap[1], Nirawit Kaewnok[1], Jitnapa Sirirak[1], Thanasat Sooksimuang[2], Adisri Charoenpanich[3]

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[2]*National Metal and Materials Technology Center (MTEC), Pathumthani 12120, Thailand*
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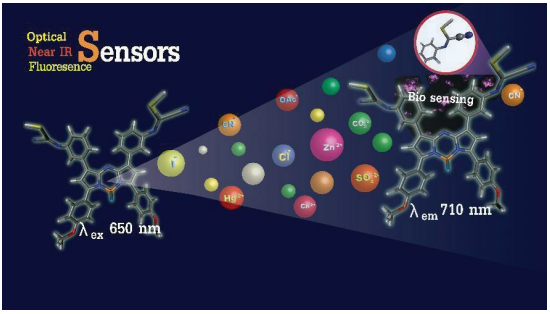
**E-mail: wanichacheva.nantanit@gmail.com; wanichacheva_n@su.ac.th*

Effective sensing methods for contaminated hazardous ions are essential for endorsing the well-being of mankind and environmental sustainability. Herein, several fluorescent and near-infrared fluorescent sensors were designed and developed. Under aqueous conditions, these sensors exhibited high selectivity for detection of hazardous heavy metal ions (Hg^{2+}, Cd^{2+}, Cu^{2+}, Zn^{2+} and Au^{3+}) and cyanide ions in visible and near-infrared frequencies. Importantly, the detection limits of these sensors were lower than the recommended values of the heavy metal and cyanide contaminants in drinking water, specified by U.S. EPA and WHO. In addition, the practical uses of the developed sensors were demonstrated in real samples such as foods, vegetables, pharmaceutical products, drinking water, river water, and sea water. These developed sensors can be utilized to promote food and environmental safety, which are the crucial global agendas for implementing the Sustainable Development Goals (SDGs) outlined by UN.

Keywords: fluorescent sensors; heavy metals; cyanide; near-infrared sensors; sustainable development goals



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AC-I-085

Professor Dr. Nantanit Wanichacheva

Nantanit Wanichacheva is Professor in Department of Chemistry at Silpakorn University, Thailand. She received her Ph.D. in Chemistry from Worcester Polytechnic Institute, Massachusetts, USA. She is currently served as Vice President for Research at Silpakorn University, Thailand. She has published many articles in Scopus and Web of Science journals, and has submitted several international and national patents. She has been working in multidisciplinary researches in chemistry, which combine organic chemistry, inorganic chemistry, physical chemistry, and analytical chemistry. Her research interests include design, syntheses, and development of novel colorimetric and fluorogenic sensors for detection of hazardous metal ions and anion. The aim and inspiration of her works is endorsing and contribution to the Sustainable Development Goals (SDGs) of United Nation Environment Programme (UNDP, 2015), which is greatly required for protection of mankind, promoting health and wellbeing as well as preventing the global ecosystem from the hazardous substances.

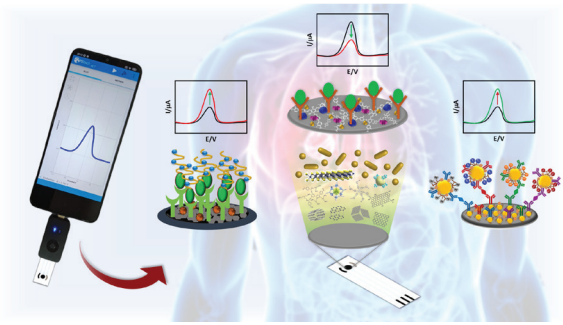
AC-I-106

Integration of functional nanomaterials with electrochemical amplification in developing sensitive immunosensors for clinical diagnostics

Jaroon Jakmunee, Kontad Ounnunkad*
Department of Chemistry, Faculty of Science, Chiang Mai University, Thailand
**E-mail: kontad.ounnunkad@cmu.ac.th*

The quantitative assays of extremely low abundant disease biomarkers can be achieved using highly specific electrochemical immunosensors. Their developments are based on the integration of functional materials with many fabrication and detection strategies for detection of the biomarkers, endowing their improved sensitivity and good performance. Since novel state-of-the-art nanomaterials, e.g., nanoparticles, quantum dots, and two-dimensional nanomaterials, with unique characteristics have been discovered, they have been used in such developments. The sensors perform with capturing the target biomarkers via antigen-antibody pairs and present no physical and chemical responses. So, many research works aim to find the amplification approaches for generation of signals, which are proportional to the target biomarker levels. At Chiang Mai University, our research demonstrates the construction of new immunosensors with label-free, sandwich, and sandwich-like configurations. The sensors from our developments enable the detections of single and multiple target biomarkers. In label-free fashion, the signal amplification is due to the blockage of charge transfer of the redox probe by the immunocomplexes while in sandwich and sandwich-like types, the responses from the amplification are of label tags and redox probe/aptamer complexes sitting on the immunocomplexes, respectively. It is found that all reduced electrochemical responses and tag/aptamer complex responses are proportional to the targets. Our sensors reveal exceptional sensitivity, selectivity, reproducibility, and stability with low limits of detection, which are sufficient for detections of such biomarkers at the clinical relevant cut-off levels. They have a potential for further development as to practical applications in the field of clinical diagnoses.

Keywords: nanomaterials; electrochemical immunosensor; diagnostics; amplification; assay



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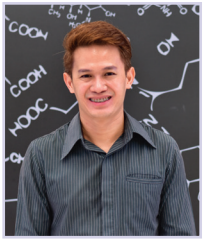
AC-I-106



Kontad Ounnunkad

Kontad Ounnunkad received his PhD in Chemistry from University of Wollongong, Australia in 2010. He is currently an associate professor at Chiang Mai University, Thailand. For his scientific achievements, Kontad received research fellowships from France Embassy in Thailand, Matsumae International Foundation and British Council in Thailand (Newton Fund). Moreover, he was awarded under Endeavour Research Fellowships from Australian Embassy. His research focuses on development of new electrochemical sensors for virus infection and disease diagnostics. Recently, he is on the list of World's Top 2% Scientists 2022 in the field of Analytical Chemistry, by Stanford University.

AC-I-107

Synthesis of silica nanoparticles modified with metal chelators for SPE of trace metals from water samples

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Mesoporous silica nanoparticles (SNPs) have found growing applications in water treatment and sample pretretment by solid phase extraction due to their large surface area and ability to be tailored to captivate specific chemicals. These materials are often produced using the sol gel process from alkoxy silane (e.g., tetraethoxy silane) precursors. Synthesis of SNPs with customizable mesoporous architectures and surface areas for certain applications is possible. However, because alkoxy silanes are rather expensive, large-scale synthesis is not feasible for limited-budgets applications like pollution removal and environmental remediation. Our present study focuses on the synthesis of SNPs from low-cost materials such as sodium and potassium silicates. To increase material selectivity for the extraction of transition/heavy metals, We apply post synthesis chemical functionalization to immobilize metal chelator such as 8-Hydroxy-2-quinolinecarboxaldehyde, and 1,10-phenanthroline-2-carbaldehyde onto the surface of SNPs. The synthesized nanochelators demonstrated adequate performance as SPE sorbents for trance metals from various water matrices. This presentation will go through the results of our most recent research in this area..

Keywords: silica nanoparticles; nanochelators; 8-Hydroxy-2-quinolinecarboxaldehyde; 1,10-phenanthroline-2-carbaldehyde

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AC-I-107

Awadh Alsuhaimi

Awadh AlSuhaimi obtained his BSc Degree in Chemistry from King Abdulaziz University, Saudi Arabia. He has spent 2 years working in oil industry and teaching in ministry of education then he has moved to king Abdul-Aziz University as a demonstrator. In 1999 he awarded a scholarship from king Abdul Aziz University to pursue his postgraduate study at the University of Hull, UK where he has studied Master and PhD in analytical science.

Currently, he works as an associate professor in Chemistry Department at Taibah University, AlMadinah AlMunwarah, Saudi Arabia. His current research interests include development of solid phase materials for the extraction of trace metals and orgainic pollutants from environmental samples and fabrication of low cost microchip based microfluidic devices.

AC-I-108

Need, quality, and sustainability-NQS index for sustainable analytical chemistry

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The Need, Quality, and Sustainability (NQS) index is proposed for evaluating analytical procedures. The NQS index is composed of "Need", need for application of the analysis as suggested by Koel in 2016; "Quality", considering by white analytical chemistry (WAC) concept; and "Sustainability", engaging The United Nation-Sustainable Development Goals (UN-SDGs). The calculation of the NQS index will be discussed. Analytical processes employing natural reagents will be evaluated using the NQS index, and the results will be compared to the corresponding standard procedures. Using the NQS index to evaluate analytical procedures could illustrate a compromised perspective that balances social demands, analytical performance, and global sustainability.

Keywords: Need-Quality-Sustainability Index; Evaluation tool; Analytical procedure; Natural reagent; Sustainable analytical chemistry

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AC-I-108

Professor Dr.Kate Grudpan

Kate Grudpan is an Emeritus Professor with over 40 years of experience in analytical chemistry. He was recognized as a pioneer in flow-based and cost-effective analysis. He has endeavored to virtualize Thai analytical chemistry research worldwide and develop multi-generational and multidisciplinary networks. He has worked for national (e.g., NCRT) and international (e.g., members of editorial boards of international journals) organizations. He has authored over 220 articles in international journals and 5 book chapters with international publishers. He has received numerous awards, including Outstanding Researcher (1998), Outstanding Scientist (2001), and the Thailand Research Fund Distinguished Research Professor Award (2017). He is also ranked in the world's top 2% of scientists by the University of Stanford. His current interests extend to green analytical chemistry and local wisdom-based green innovation. He initiates using a natural reagent for chemical analysis and the NQS index with the supports of Thai colleagues and international scientists.

AC-I-109

Synthesis of sorbents for solid-phase extraction and its application to flow analysis

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Solid-phase extraction (SPE) is extensively used for the extraction and purification of a wide range of compounds. A variety of separation modes are used in SPE: reversed-phase (RP), ion-exchange, chelating, and so on. Among these modes, the RP-type SPE sorbent is widely used in pretreatment. But severe problems such as a low recovery rate and low degree of purification may occur on the SPE of relatively higher water-soluble compounds in aqueous solutions.

To solve these problems, we have developed RP-type sorbents and hydrophilic interaction chromatography-type sorbents for water-soluble compounds in which nucleobases and nucleosides were used as model water-soluble compounds. Furthermore, we proposed binding methods of particulate sorbents to make several adsorption media; we call them molding-type solid-phase extraction media. These functional sorbents can be introduced into flow analysis for water quality control, urianalysis, breath analysis.

Also, we investigated the SPE characteristics of hydrous alumina for phosphate and phosphonates.

In this lecture, we introduce the above-mentioned recent studies.

Keywords: sorbent; solid-phase extraction; flow analysis; water quality control

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AC-I-109

Norio Teshima

He is a professor of Department of Applied Chemistry in Aichi Institute of Technology that has ~6,000 students. In 1996, he received his Ph.D. in analytical chemistry under Prof. Takuji Kawashima of University of Tsukuba. His work focuses specifically on kinetic catalytic methods of analysis, environmental and biogas analysis, and sample pretreatment by solid-phase extraction.

In 2018, he has been appointed to the chairman of the Japanese Association for Flow Injection Analysis (JAFIA). The JAFIA was founded by Professor Nobuhiko Ishibashi in Jan. 1984, since then it has been built by the 2nd Prof. Yosuke Ohkura, the 3rd Prof. Shoji Motomizu, the 4th Prof. Tadao Sakai and the 5th Prof. Toshihiko Imato, together with all JAFIA buddies. Let him inform you all of the Journal of Flow Injection Analysis (JFIA). The successive JFIA editor-in-chiefs have been continuously maintaining and developing the JAFIA activities. He asks you all to contribute to the JFIA.

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AC-I-066

The novel platforms for detection of infectious diseases

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In our group, we have been developing novel platforms which are easily accessible, simple, portable, and affordable for biomarker detection. Several strategies have been proposed to minimize multistep reagent manipulation. For instance, an automated fast-flow/delayed paper-based platform has been described in 2021 for the simultaneous electrochemical detection of hepatitis B surface antigen (HBsAg) and hepatitis C core antigen (HCVcAg) [1]. This platform was fabricated from paper-based analytical device and engineered to combine dual flow behaviors (fast-flow/delayed) into a single device. In 2022, we further reported an enzyme-linked immunosorbent assay (ELISA) using an automated microfluidic interface [2]. Lipoarabinomannan, a urinary biomarker of active tuberculosis, could be detected within 15 min by using this developed device. Recently, we are ongoing research novel platforms for detection of infectious diseases. Based on lateral flow analysis, a novel platform of an electrochemical capillary-driven microfluidic DNA sensor has been developed for human immunodeficiency virus-1 (HIV-1) and hepatitis C virus (HCV) coinfection analysis. This DNA sensor integrated static and flow-based systems featuring burst valve technology into a single device to control fluid flow inside the device. In addition, by using vertical flow principle, the time-resolved electrochemical vertical flow-based immunosensor (TR-eVFIS) has been established for simultaneous detection of HBsAg and HBeAg, the biomarkers for hepatitis B virus infection. These two biomarkers can be detected simultaneously on one working electrode within the overall assay time of 6 min. These proposed platforms contribute to the development of next-generation point-of-care (POC) testing devices for the detection of a wide range of infectious diseases.

Keywords: infectious diseases; microfluidic device; burst valve; lateral flow analysis; vertical flow-based immunosensor

References

[1] S. Boonkaew, A. Yakoh, N. Chuaypen, P. Tangkijvanich, S. Rengpipat, W. Siangproh, O. Chailapakul, An automated fast-flow/delayed paper-based platform for the simultaneous electrochemical detection of hepatitis B virus and hepatitis C virus core antigen, Biosens. Bioelectron. 193 (2021) 113543.
[2] Y. Panraksa, I. Jang, C.S. Carrell, A.G. Amin, O. Chailapakul, D. Chatterjee, C.S. Henry, Simple manipulation of enzyme-linked immunosorbent assay (ELISA) using an automated microfluidic interface, Anal. Methods 14(18) (2022) 1774-1781.

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INVITED SPEAKER ABSTRACTS

CC

Catalytic Chemistry

CC-I-002

Fabrication of hierarchical zeolites for bioethanol upgrading: From laboratory-scale to pilot-scale

Chularat Wattanakit*, Chadatip Rodaum, Anawat Thivasasith, Marisa Ketkaew, Ploychanok Iadrat, Peerapol Pornsetmetakul, Peeranat Chaipornchalerm, Watinee Nunthakitgoson, Supakorn Tantisriyanurak, and Anittha Prasertsab
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Bioethanol obtained from a renewable agricultural resource has become a promising feedstock for producing several chemical compounds, such as ethylene, diethyl ether, and acetic acid. In this contribution, we report the new approach for the catalyst design based on zeolites and zeolite composites with hierarchical structures. Various hierarchical zeolite frameworks have been synthesized by a simple hydrothermal process, such as ZSM-5, MOR, and FER. The designer catalysts exhibit outstanding physicochemical properties in particular high surface area and porosity, and suitable acidity, eventually improving catalytic performances in bioethanol conversion to ethylene. To gain insights into the mechanistic perspectives of bioethanol conversion, we also integrated *in-situ* diffuse reflectance infrared Fourier transform spectroscopy (DRIFTS) studies and density functional theory (DFT) calculations to understand the effect of different zeolite frameworks on the catalytic transformation of bioethanol. To develop the industrial catalysts, the rational design of binder-free hierarchical ZSM-5 monolith derived from zeolite@layered double hydroxides (LDH) composites via traditional extrusion and 3D printing technologies has been demonstrated. The designer catalyst applied in bioethanol dehydration boosts ethylene yield by over 96% due to the synergistic effect of zeolites and LDHs. This is the first example illustrating the design of highly efficient catalysts, which can be applied directly in industrial applications. Last but not least, we also illustrate the application of the designer catalysts in the bioethanol dehydration to ethylene on a pilot-plant scale. This example opens up new perspectives on the industrial catalyst design for bioethanol upgrading applications.

Keywords: hierarchical zeolites; bioethanol; ethylene; zeolite@LDH composites; extrusion

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CC-I-002

Chularat Wattanakit

Asst. Prof. Chularat Wattanakit studied at Kasetsart University, Bangkok where she received a Ph.D. in Chemistry in 2013. She also received a Ph.D. in Physical Chemistry from the University of Bordeaux (France) in 2013. Then, she was a postdoctoral researcher at Nagoya University and worked as a researcher for SCG Chemicals Co., Ltd. Since 2015, she has served as a faculty member at the School of Energy Science & Engineering (ESE) at VISTEC. In 2018, she received the Thailand Young Scientist Award by the Foundation for the Promotion of Science and Technology under the Patronage of His Majesty the King. In addition, she was also recognized with the CSJ Distinguished Lectureship award 2020 given by the Chemical Society of Japan (CSJ) and the CST Distinguished Young Chemist Award 2020 (Physical Chemistry) by the Chemical Society of Thailand. Her research interests relate to heterogeneous catalysis and electrocatalysis.

CC-I-017

Rational design of heterostructured photocatalysts for sustainable chemical conversions

Önder Metin*
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Over the years, significant progress has been made for human well-being in agriculture, energy, and health. However, some of them have damaged the environment and therefore sustainability has become the concern of the whole world today. Fundamental sciences are the key to finding a solution to this global problem. Among the basic sciences, chemistry is one of the most important scientific tools for sustainability because most manufactured products involve one or more chemical processes. In this regard, green chemistry has received much attention in recent years. In order to realize the rules of green chemistry, the integration of photocatalysts, which can collect a large part of the solar spectrum, into chemical reactions is one of the most promising ways to develop more efficient, sustainable, and economical chemical transformations. However, the use of single-component photocatalysts is limited due to difficulties in finding suitable band positions and electron-hole recombination problems in photocatalytic applications. Therefore, the design of heterojunction photocatalysts in which at least two semiconductors with suitable band positions are combined to obtain superior photocatalytic properties can be considered as a promising solution. In recent years, we have rationally designed graphitic carbon nitride (gCN) and/or black phosphorus (BP)-based heterojunction photocatalysts in various chemical transformations. In this talk, after introducing the fundamentals of semiconductor photocatalysis and heterojunction photocatalysts, I will summarize my research group's recent studies about the rational design of gCN and/or BP based heterostructured photocatalysts for hydrogen production and the photoredox C-H activation under visible light irradiation.

Keywords: sustainability; photocatalysis; heterostructured photocatalyst; hydrogen production; photoredox C-H activation

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CC-I-017

Önder Metin

Dr. Önder Metin received his Ph.D. degree from Department of Chemistry, Middle East Technical University, Türkiye, in 2010. He studied as visiting scholar at Department of Chemistry, Brown University (Rhode Island/USA) in 2009 and at Darmstadt Technical University, Germany in 2010. In 2011, he got an Assistant Professor position at Department of Chemistry, Atatürk University, Türkiye. He then joined the Department of Chemistry, Brown University, U.S.A., as a post-doc in 2012-2013. He promoted to the Associate Professor level in 2015. He received numerous scientific awards given to outstanding young scientists working in Türkiye. He is an elected associate member of Turkish Academy of Sciences since 2018. He has been a Member of the Board of the Turkish Chemical Society since 2017 and an executive board member of Federation of Asian Chemical Societies (FACS) since 2019. He has conducted research on transition metal nanoparticles, nanocatalysis, photocatalysis and heterogeneous catalysis, electrocatalysis, 2D materials, hydrogen storage, fuel cells, rechargeable Lithium batteries and sustainable organic transformations. He has published over than 120 scientific papers (>7500 citations and h-index = 45) in mostly high impact journals.

CC-I-034

Machine learning-assisted investigation of heterogeneous catalyst: A case study at oxidative coupling of methane

Shun Nishimura*

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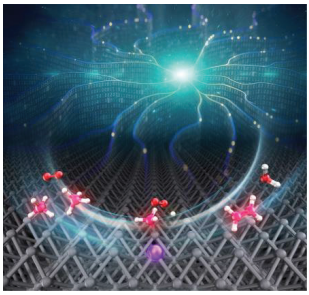
Conventionally, catalyst scientists have brushed-up his/her experiences based on published data and/or physicochemical knowledge, and then arranged his/her next research subject towards new avenues at the academic/industrial area. This style of research apparently covers the close area within the previous work but leads outstanding performance in some cases. While, on the other hand, data-driven approaches to catalyst design and discovery have received considerable attentions in the world along with the intense growth of data management and machine learning (ML) engineering skills. How can those tools guide effective movements at next generation of catalyst chemistry is an attractive subject. Herein, recent achievements for heterogeneous catalyst informatics, in particular at the target of oxidative coupling of methane (OCM), is the subject for discussion. Data management and ML engineering tools gain great potentials to reveal hidden trend of catalysis and find unreported type of catalysts. However, finding the outstanding performance catalysts is still challenging owing nature of ML. The present author focuses on a way that how to receive useful feature based on ML-constructed model into the next experimental validation. Also, it is considered that close relationship between conventional scientist and data scientist is a key for successful investigation of heterogeneous catalyst based on ML engineering.

Keywords: heterogeneous catalyst informatics; machine learning (ML); data management; oxidative coupling of methane (OCM); how to receive data features by ML



Catalyst informatics approaches at OCM

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CC-I-034

Shun Nishimura

Dr. Shun Nishimura received his Ph.D. at School of Materials Science in JAIST in 2011 for synthesis and catalysis of metal nanoparticles. He joined the JAIST faculty member as Assistant Professor in 2011, and became Associate Professor in 2018. His research interests lie in the development of highly functionalized nano-structured catalysts, especially heterometallic nano-catalysts. Also, he joins catalyst informatics project since 2018, and focuses on the implementation of machine learning-driven catalyst investigation. He has published over 87 international papers.

CC-I-040

High performance iron oxide/carbon nanocatalysts for the decomposition of methylene blue

Thinnaphat Poonswat[1], Thanyaphat Techalertmanee[1], Isti Yunita[1], Peerapong Chumkaeo[1], Titiya Meechai[1], Montree Namkajorn[1], Soraya Pornsuwan[1], Ekasith Somsook[1]*

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Iron oxide/carbon nanocatalysts were successfully synthesized by the calcination of ferrocenium at high temperatures ranging from 500°C to 900°C. Then the synthesized nanocomposites were characterized by XRD, TEM, VSM, BET, TGA, XPS, EPR, and CHN. The prepared nanocatalysts were applied for the decomposition of methylene blue as a model for the treatment of waste water. It was unexpected to discover that the prepared nanocatalysts were highly active for the reaction with methylene blue in the dark even though no excess of hydrogen peroxide was added. The nanocatalyst calcined at 800°C exhibited the rod shape with the best catalytic activity. The nanocatalysts could be reused for 12 times without the significant loss of the catalytic activity.

Keywords: iron oxide; carbon; nanocatalyst; ferrocenium; methylene blue

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CC-I-040

Ekasith Somsook

Ekasith Somsook is now a lecturer at Department of Chemistry, Faculty of Science, Mahidol University. His research interest is the development of catalysts for biorefinery and chemical recycling of plastics.

CC-I-041

Green reduction route via ethanol dehydrogenation and decomposition for Pd-promoted Co_3O_4/SBA-15 catalysts in reverse water gas shift reaction: An *operando* time-resolved X-ray absorption spectroscopy investigation

Nattawut Osakoo[1,2], Pimrapas Tawachkultanadilok[1], Sirinuch Loiha[3], Frank Roessner[4]
Yingyot Poo-arporn[5], Pinit Kidkhunthod[5], Narong Chanlek[5], Sanchai Prayoonpokarach[1],
Jatuporn Wittayakun[1,*]

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An alternative reduction route of Pd-promoted Co_3O_4 supported on SBA-15 under ethanol dehydrogenation and decomposition (ED) was studied by an *operando* time-resolved X-ray absorption spectroscopy (TR-XAS) to understand the insight nature of materials. The catalysts, xPd-10Co/SBA-15, were prepared by co-impregnation method where the Pd content, x = 0.2, 0.5 or 1.0 wt% and Co content = 10.0 wt%. The precursors were transformed to PdO and Co_3O_4 after calcination and to metallic form after reduction. The reducibility of Co_3O_4 to metallic Co in 1Pd-10Co/SBA-15 was 98.0%, whereas the metallic form was not produced in the absence of Pd. This catalyst also provided the highest H_2 yield of 80% from ED at 500 °C. The ED-reduced 1Pd-10Co/SBA-15 was tested in reverse water gas shift reaction (RWGS) and characterized by the *operando* TR-XAS. The CO selectivity from CO_2 was 97.8%, slightly higher than conventional H_2-reduced 1Pd-10Co/SBA-15.

Keywords: cobalt; palladium; ethanol dehydrogenation; reverse water gas shift, operando TR-XAS

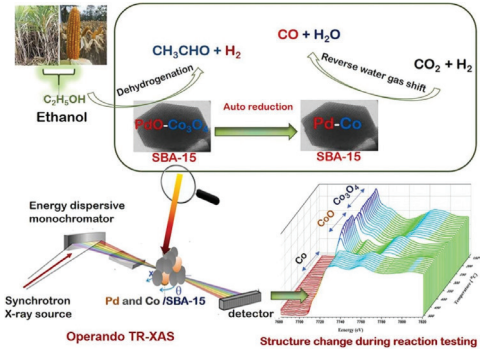

Figure 1. *Operado* TR-XAS of Pd-promoted Co_3O_4 supported on SBA-15 under ethanol dehydrogenation and decomposition (ED) and in reverse water gas shift reaction (RWGS)

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CC-I-041

Jatuporn Wittayakun

Jatuporn Wittayakun (Tu) is a Professor in Chemistry at Suranaree University of Technology (SUT), Nakhon Ratchasima, Thailand. He obtained his BS in Chemistry in (1991) from Khon Kaen University; MS in Chemistry (1995) from Colorado School of Mines, USA under the supervision of Professor Scott W. Cowley; and Ph.D. in Chemistry (2000) from University of Wisconsin-Madison, USA under the supervision of the late Professor Lawrence F. Dahl. All his study was supported by the Thai government. He started his academic career as a lecturer in SUT in 2000 and became an assistant professor in 2002. He received a scholarship to conduct a one-year research in Vienna University of Technology (TU Wein), Austria in 2002 under supervision of Professor Hannelore Vinek. He was promoted to associate and full professor in 2005 and 2015, respectively. His research interest includes heterogeneous catalysis of supported catalysts for various reactions such as hydrogenolysis of light hydrocarbons, transesterification of vegetable oils, phenol hydroxylation, conversion of biomass-derived compounds. Several catalysts from this work were characterized by synchrotron techniques including X-ray absorption (XAS) and X-ray photoelectron spectroscopy (XPS). One of his recent publications employed an in situ and operando time-resolved XAS. His research also involves the synthesis and modification of microporous and mesoporous materials for catalysis and adsorption.

CC-I-042

Dendrimer assisted synthesis of bimetallic nanoparticles and their catalytic applications

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The development of nanotechnology for the preparation of metal nanoparticles creates new opportunity for a catalytic revolution. Bimetallic nanoparticles have gained significant attention because of their promising properties, unique features and novel applications in catalysis in various carbon-carbon cross-coupling reactions and redox reactions under mild conditions. Dendrimer assisted bimetallic nanoparticles (Pd/Cu, Pd/Co, Pd/Ni, Pd/Zn, Cu/Zn and Ni/Cu) have been synthesized via sequential reduction method and co-complexation method successfully confirmed by SEM, EDX, XRF, XRD, TEM analysis. These dendrimer supported bimetallic nanoparticles have been effectively applied as heterogeneous catalyst of carbon-carbon cross-coupling reactions such as Heck, Sonogashira, Suzuki, Glasser reactions and also Ynones preparation reactions. For the heterogeneity study, these catalysts were recovered and successfully applied further cross-coupling reactions without any noteworthy loss of activity. It was observed that the Cu nanoparticles in these bimetallic systems could activate and stabilize the alkynes during Sonogashira catalytic cycle affording the high yield of the product. Oxidation of alcohol was carried out successfully by different molar ratios of Pd/Cu, Ni/Cu and Zn/Cu bimetallic nanoparticle catalyst as effective catalyst and found Pd/Cu (2:1), Ni/Cu (3:1) and Zn/Cu (2:1) more effective than other molar ratios. These dendritic ligands assisted bimetallic nanoparticles will open up a new era in the field of catalysis.

Keywords: nanoparticle; bimetallic; dendrimer; Heck reaction; Sonogashira

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CC-I-042

Md Wahab Khan

He had the unique experience and career as a Professor of Chemistry in the prestigious Bangladesh University of Engineering and Technology (BUET). After retirement from BUET he has been serving as a professor in International University of Business Agriculture and Technology (IUBAT) since 29 November 2021. He has supervised 5 Ph.D. students, 32 M. Phil and 6 M.Sc. students. He has published 65 Publications in accredited international journals. He has been involved in international organizations such as – in Federation of Asian Chemical Societies (FACS) as Secretary General (2016-2017), in International Union of Pure and Applied Chemistry (IUPAC) as National Representative (Fellow) and International Chemistry Olympiad (IChO) as Head Mentor. He was also General Secretary and Treasurer of Bangladesh Chemical Society (BCS), Convener of Bangladesh Chemistry Olympiad and Organizing Secretary of Asian Chemical Congress (16 ACC). He has been acting as a Chairman of Chemical Divisional Committee in Bangladesh Standards and Testing Institute (BSTI).

CC-I-043

Hexagonal mesoporous silica supported with bimetallic Fe-Ni to produce sustainable biofuel via deoxygenation under hydrogen-free condition

Suraya Zulkepli[1], Noorsaadah Abd. Rahman[2], Hwei Voon Lee [1]
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The need of sustainable fuel due to the economic and environmental concern has attracted a lot of concern. Aligned with sustainable development goal (SDG) 2030, there isa need to develop affordable, reliable, and sustainable biofuel. Therefore, catalytic deoxygenation under hydrogen free condition is a technology of increasing relevance for the production of hydrocarbon-line biofuel from non-edible oils. Generally, the catalytic deoxygenation involves two major routes: i) hydrodeoxygenation (HDO) and ii) decarboxylation and decarbonylation (DCO). The DCO pathway seems to be preferable in principle due to the cost and environmental impact. The oil or triglycerides is considered as large molecules which will encounter diffusional limitations and thus the pore size plays a critical role. We have synthesized mesoporous material such as hexagonal mesoporous structure (HMS) supported with bimetallic Fe-Ni. It is interesting to observe, the bimetallic Fe-Ni supported on HMS demonstrate outstanding catalytic with 96% conversion and 92% selectivity towards diesel range (C_{8}-$_{20}$ hydrocarbon). This is due to strong acidity (7870.76 µmol of NH^3g^{-1}), desirable pore size (3.97 nm) and high surface area (507 m^2g^1). This finding shows that mesoporous type of catalysts supported with bimetallic Fe-Ni is highly potential for providing sustainable hydrocarbon like-biofuel via DO reaction under hydrogen free-condition.

Keywords: mesoporous; catalysis; deoxygenation; hydrodeoxygenation; biofuel

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CC-I-043

Joon Ching JUAN, Ph.D.

Dr. Joon Ching Juan is the Associate Professor of Catalysis at Nanotechnology and Catalysis Research Centre (NANOCAT), University of Malaya, Malaysia. He is also appointed as a Senior Research Fellow (Adjunct) at Monash University, Sunway Campus and Deputy Dean of Frontier Natural World Research Cluster, University of Malaya. He received his BSc (Hons) Chemical Technology (2003) and PhD in Chemistry (2007) degrees from the National University of Malaysia, Malaysia. Up to date, he has managed to publish more than 180 WoS publications with an h-index of 41 (7,321 citations). He has supervised 35 postgraduate students, 27 of whom are PhD students. With his expertise and experience, he has received about RM 5,000,000 (USD 1,144,008) grants from national and international organizations. As a strong believer in research driven innovation, he has filed 6 patents to be used in industries. Most of his research activities are focused on understanding the surface chemistry and nano-structure to be applied in environmental, energy and lubricant.

CC-I-044

Nanocatalysts and nanomaterials for catalytic C1 conversion towards sustainable development goals

Metta Chareonpanich [1,2,*], Waleeporn Donphai [1,2], Thongthai Witoon [1,2]
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[2]*Center for Advanced Studies in Nanotechnology and its Applications in Chemical, Food and Agricultural Industries, Kasetsart University, Bangkok 10900, Thailand*
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Increasing concerns over global warming caused by greenhouse gases and depletion of fossil fuel resources have created a variety of strategic routes for sustainable energy and environment. Carbon dioxide (CO_2) and methane (CH_4) are considered as major greenhouse gases, and therefore the conversion of CO_2 and CH_4 to value-added products is one of the most promising ways to mitigate the problem. The utilization of CO_2 to produce value-added chemical feedstock, fuels, and alternative energy not only solves global warming and climate change problems, but also potentially provides a great opportunity for green and sustainable development in energy and environment. This presentation is focused on the production of a group of green catalysts and adsorbents from low cost, agricultural wastes and renewable resources based on green and circular economy concepts. The diverse applications of green catalysts for sustainable energy and environment—green energy/feedstock production via catalytic C1 conversion over a group of novel catalysts under magnetic field, catalytic methane decomposition and light olefin production over functional catalysts, an application of chlorophyll-modified green catalysts under visible-light irradiation—are reviewed and presented. Future outlook on nanocatalysts and nanomaterials for sustainable energy and environment are discussed.

Keywords: nanocatalysts; CO_2 hydrogenation; green catalysts; sustainable development goals

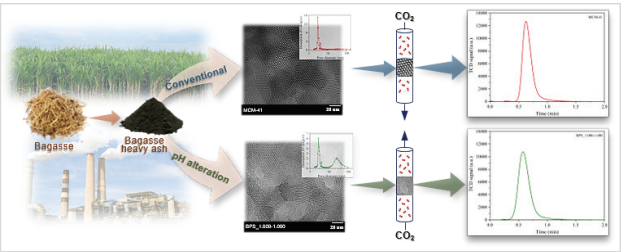

Fig. 1. Schematic of MPS synthesis from bagasse heavy ash and CO_2 diffusion test.

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CC-I-044

Professor Dr. Metta Chareonpanich

Professor Metta Chareonpanich's research career has been established on "Cleaner Production Concept". She has expertise in multidisciplinary research on catalyst and absorbent preparation. Her research applications are mainly focused on VOC absorption and multifunctional catalysts for green chemical feedstock and alternative energy production from greenhouse gases. Following her academic achievements, Professor Chareonpanich has been invited to deliver keynote speeches at various local and international conferences; served as a guest editor (Topics in Catalysis, ChemCatChem, and Cleaner Production) and reviewer for more than 50 well-recognized international academic journals. Professor Chareonpanich was given the L'Oréal Thailand's "For Women in Science" Fellowship Award with the support of the Thai National Commission for UNESCO, received the PTIT Fellow Awards from Petroleum Institute of Thailand as the lecturer who has conducted outstanding academic research that are accepted by education and industrial sectors in the areas of Petroleum and Petrochemicals, and so on.

Professor Metta Chareonpanich received a bachelor's degree in Chemistry from Kasetsart University, a master's degree in Chemical Engineering from Chulalongkorn University and a doctoral degree in Applied Chemistry (Monbusho Scholarship) from Tohoku University, Japan.

Web page: http://che.eng.ku.ac.th/web2019/index.php/assoc-prof-dr-metta-chareonpanich/

CC-I-045

Technology translation out of the laboratory into commercial reality

Thomas Maschmeyer
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This talk deals in the main with the translation of fundamental scientific discoveries in catalysis into commercial reality, focusing on the Catalytic Hydrothermal Upgrading Reactor Technology (Cat-HTR).

This is a catalytic process employing water to convert plastic and biowaste into like-for-like fuel and replacement chemicals. It is a technology designed to help enable a circular economy. Following on from a general overview, the processing of biomass into biocrude and its further upgrading within various existing refinery streams will be discussed, using model compounds to illustrate a chemical (reaction mechanisms) point of view and using real feeds to present a chemical engineering (refinery processes) perspective.

Then the technology's application to end-of-life mixed plastics will then be introduced, and its economic viability discussed.

Keywords: sustainability; renewables; supercritical; water; recycling

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CC-I-045

Thomas Maschmeyer

Thomas Maschmeyer is a Professor of Chemistry at the University of Sydney, Founder of the London-listed Gelion plc (GELN), an energy storage company, and co-founder of the waste upcycler Licella Holdings. After completing his PhD in 1994 he went on to hold positions at the Royal Institution of Great Britain, the University of Cambridge, and the TU Delft's Institute of Chemical Technology before returning to the University of Sydney as an ARC Federation Fellow. He is Fellow of three Academies and has received numerous prizes and awards, including the Distinguished Contribution to Economic Development FCAS Award (2019), the 'Prime Minister's Prize for Innovation' across all technologies (2020) and the David Craig Medal (2021), the Australian Academy of Science's highest award in chemistry. His research interests cover catalysis and sustainable processes, renewable and circular feedstocks (waste biomass/plastics), green hydrogen, ionic liquids, micro- and mesoporous nanostructured materials, reversible energy-storage devices. Mura Technology has licenced Licella's plastic conversion technology and is engaged in a global roll-out with Dow, KBR, Mitsubishi Chemicals, LGChem, Chevron Phillips. Dow has committed to five 125 ktps plants alone.

INVITED SPEAKER ABSTRACTS

CE

Chemical Education

CE-I-014

Empower chemistry education in a sustainable future

Chanyah Dahsah*
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Sustainability has been in the center of attention among societies and is a fundamental part of scientific citizenship. Having students comprehend how science and sustainability are connected shapes them to become environmental active citizens in order to deliver innovative products, provide available options, and make rational decisions for others. In *Nature (April 2022)* pointed out the ideas that chemistry education must be changed with sustainability concepts in chemistry courses to help the planet by equipping school and undergraduate students. Thus, in this study, 42 articles in Journal of Chemical Education related to education for sustainability development (ESD) published between 2008 – 2022 were systematically reviewed to identify how chemical education promote education for sustainability. The results showed that the concepts of sustainability were mostly integrated into introductory courses and laboratories for undergraduate students, and outreach program/extracurricular activities for high school students. Interestingly, none of the work has been conducted in Asia while most of them are from United States (20 articles) and Europe (10 articles). The results suggest four models for implementing ESD in chemistry education: (1) integrating sustainability concepts or issues to chemistry teaching and content, (2) adopting green chemistry principles and strategies (i.e., sustainable metrics, learning cycle assessment, LCA) to chemistry teaching or laboratory, (3) integrating systems thinking approach to chemistry or green chemistry concepts, and (4) using innovative learning strategies (i.e., problem-based learning, socio-scientific issues, Gamification, Interactive digital learning) to engage students to issues related to sustainability.

Keywords: Sustainability, Education for Sustainability development, green chemistry, systems thinking, chemistry

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CE-I-014

Chanyah Dahsah

Dr. Chanyah Dahsah is an assistant professor of science education and director of Science Education Center, Faculty of Science, Srinakharinwirot University. She received a Ph.D. in Science Education from Kasetsart University, Thailand in collaboration with the University of Waikato, New Zealand in 2007. In 2013 - 2015, she worked as a researcher for the CREATE for STEM Institute at Michigan State University, U.S. Her research interests include K – 12 STEM, science learning and assessment, and professional development for in-service science and STEM teachers. Her current projects aim to train kindergarten teachers how to create STEM learning activities and ESD. Her other focus is to train primary and secondary school teachers on STEM and Entrepreneurial curriculum development. Her teaching also meets the criteria of the UK Professional Standards Framework (UKPSF), and she is awarded as a Senior Fellowship by Advance HE.

INVITED SPEAKER ABSTRACTS

EE

Environmental Chemistry and Renewable Energy

EE-I-042

Source Apportionment of $PM_{2.5}$ During Smoke Haze and Non-smoke Haze Periods in Northern Thailand

Somporn Chantara[1,2*], Sarana Chansuebsri[1], Natthanit Kantarawilawan[1], Pavidarin Kraisitnitikul[1], Nuttipon Yabueng[1], Duangduean Thepnuan[3]

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Upper Southeast Asia as well as Northern Thailand have been annually experienced air pollution during dry season (February to April). To identify sources of air pollution, $PM_{2.5}$ samples collected in 2020 in Chiang Mai city were analyzed for their chemical composition including metals, carbon contents, water soluble ions and water-soluble organic carbons. They were used for source apportionment of $PM_{2.5}$ by Positive Matrix Factorization (PMF). The results showed that source contribution of $PM_{2.5}$ in dry season 2020 were biomass burning (48%), secondary aerosols (27%), road dust (15%) and traffic (10%). For non-burning season (July), the main source of $PM_{2.5}$ in the city was mainly from traffic (69%). No accumulation of secondary aerosols was observed because of wind and rain scavenging to disperse and reduce atmospheric pollutants. This result revealed high air pollutants in Northern Thailand during the burning season. Primary pollutants are mostly emitted from anthropogenic activities such as biomass burning and traffic, while traffic emission is relatively constant for the whole period. Secondary pollutants were produced from chemical reactions of accumulated primary pollutants during smoke haze period. Therefore, their concentrations were low in non-smoke haze period.

Keywords: air pollution; secondary aerosols, source apportionment

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EE-I-042

Somporn Chantara

Assoc. Prof. Dr.Somporn Chantara obtained her B.S. (Chemistry) in 1992 and M.S. (Environmental Risk Assessment for Tropical Ecosystems) in 1994 from Chiang Mai University, Thailand. She received her Ph.D. in Biogeography in 2000 from Trier University, Germany. She is currently a head of Environmental Science Research Center (ESRC) and a head of a working group of Academic Center for Air Pollution in Northern Thailand (ACAir), Chiang Mai University. Her work is mainly focus on air pollution monitoring and analysis. Her most significant contributions are in the field of atmospheric chemistry particularly air pollution assessment for source analysis and health impacts based on chemical composition of atmospheric fine particles. Her roles as a member of several committees both in local and national levels in the fields of environment and air pollution are well recognized.

EE-I-043

Biological sample analysis in Occupational health and safety: Case study in the waste disposal plants

Prayad Kenyota[1,2] and Wanida Jinsart[1,*]

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2 Division of Occupational and Environmental Diseases, Department of Disease Control, Ministry of Public Health; Tiwanon Rd. Taladkan subdistrict, Mueang district, Nonthaburi 11000 Thailand.

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The heavy metal exposure of workers in two waste disposal plants were studied in an electronic disposal plant1 and a plastic waste plant2. The workers have been exposed to various pollutants, during the waste treatment process. Particulate matter samples were collected using a Personal Modular Impactor (PMI) in the working area and personal sampling. The urine samples were collected from volunteer workers following the national guideline method. PM concentrations were analyzed by the gravimetric method. Heavy metals, As, Pb, Cr, Cd, and Hg associated with PM, and in the urine samples were analyzed by Inductively Coupled Plasma Spectrometry. The heavy metal concentrations in particulate matter were within the limit level prescribed by the Occupational health national standard. As, Cd and Pb in urine samples of plant 1 were higher than in plant 2. This could be because the waste loading in plant 1 was higher in electronic waste than in plant 2, where the majority of waste was plastic and organic waste. This could due to the waste loading in plant 1 was more electronic wastes than in plant 2 which majority wastes were plastic and organic wastes. The non-carcinogenic risk assessment, Hazard Quotient, and Hazard Index of As and Cd in oral/ingestion route exposure were more than 1. Cancer risk of As, Cd, and Pb in oral/ingestion exposure and As in dermal exposure were >10-6 in both plants. To reduce risk, the control of food/drink intake in the workplace, an annual health check program, and mandated the using of personal protective equipment were recommended.

Keywords: particulate matter, heavy metal, worker exposure, health risk, industrial wastes

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EE-I-043

Wanida Jinsart

Wanida Jinsart, Professor in air pollution and environmental health, has taught and research in this area for more than twenty years at Department of Environmental science Chulalongkorn university. She had her Ph.D. in chemistry and biochemistry from La Trobe University in 1993. She had collaborated researches with many international institutes including Monash University, University of Tokyo, Teikyo University, University of Liverpool, UNTAG university etc. She also had experiences in academic administration: Head, Department environmental science 2002-2006 and 2018-2020 Chair of the Toxicology industrial environment postgraduate program 2018-2020 President: Thai Society of Higher Education Institutes on Environment 2017 -2022 Editor in Chief: Environment Asia, a scopus journal since 2017- 2023, Board committee: The Science society of Thailand under the patronage of His Majesty the King 2022-2023.

EE-I-045

Recent advancement of atmospheric nanoparticle research in Southeast Asia

Perapong Tekasakul[1,2]*, Racha Dejchanchaiwong[1,3], Thammasin Ingviya[1,4]
[1]*Air Pollution and Health Effect Research Center, Prince of Songkla University, Thailand*
[2]*Department of Mechanical and Mechatronics Engineering, Faculty of Engineering, Prince of Songkla University, Thailand*
[3]*Department of Chemical Engineering, Faculty of Engineering, Prince of Songkla University, Thailand*
[4]*Department of Family and Preventive Medicine & Digital Innovation and Data Analytics, Faculty of Medicine, Prince of Songkla University, Thailand*
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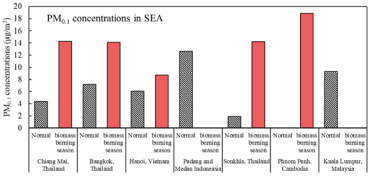
Nanoparticles or ultrafine particulates ($PM_{0.1}$) have become an increasing problem in Southeast Asia (SEA) due to rapid industrialization, urbanization, and open biomass burning as a result of forest fires and agriculture waste burning. $PM_{0.1}$ constitutes dominant proportion of airborne particulates in large number and has been associated with human health, ecosystems, and changes in regional climate. $PM_{0.1}$ has been shown to be a potentially more significant health hazard. Evidence from many countries confirms damage to health from $PM_{0.1}$ including respiratory, cardiovascular, neurological, metabolic, and carcinogenic effects. The toxicity is increased with smaller size, larger surface area, adsorbed surface materials, and the physical and chemical characteristics of the particles. The studies on physical, chemical and source characteristics of $PM_{0.1}$ in SEA are still limited. Research on the $PM_{0.1}$ and its chemical components in this region has been conducted mostly during 2014-present. Although vehicle emission generally dominates $PM_{0.1}$, biomass generates a significant proportion during the burning seasons in SEA. $PM_{0.1}$ has accounted for ~15% of $PM_{2.5}$ in upper SEA, and ~18% in lower SEA. Sources of $PM_{0.1}$ in major SEA cities were identified to be dominant by vehicle exhausts especially diesel engines during normal periods, while, during haze periods, major sources of $PM_{0.1}$ in SEA countries were influenced by open biomass burning. The toxicities of polycyclic aromatic hydrocarbon in $PM_{0.1}$ during haze periods in SEA were as high as 8 times compared to normal periods. Open biomass burning clearly contributed a significant portion of $PM_{0.1}$ during SEA haze periods. Whether from a qualitative or quantitative perspectives, the research on $PM_{0.1}$ in SEA is still needed to better understand physical and chemical characteristics, sources, transport, and influences on human health and ecosystems. The control of $PM_{0.1}$ has a long way to go, and requires continuous research.

Keywords: SEA; nanoparticle; open biomass burning; health effect; haze



$PM_{0.1}$ mass concentration in the major cities of SEA.

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EE-I-045

Perapong Tekasakul

Degree Information:

B.Eng. Mechanical Engineering, Chulalongkorn University, Thailand Year 1988

M.Sc. Mechanical Engineering, University of Missouri–Columbia, USA Year 1992

Ph.D. Mechanical Engineering, University of Missouri–Columbia, USA Year 1996

Research Interests:

Aerosol mechanics, Fluid dynamics, Computational fluid dynamics, Air pollution, Atmospheric chemistry, Air pollution control and management

Honors and Distinctions:

Year 2006-2009: Editor-in-Chief: Songklanakarin Journal of Science and Technology, Thailand
Year 2009 & 2020: Outstanding Researcher Award: Faculty of Engineering, Prince of Songkla University, Thailand

Year 2009-2015: Editor: Aerosol and Air Quality Research, Taiwan

Year 2015-Present: Collaborative Professor: Kanazawa University, Japan

EE-I-046

Engineering tungsten oxide for energy storage applications

Mohammad R.Thalji[1], Gomaa A.M.Ali[2], Porun Liu[3], Yu Lin Zhong[3], Kwok Feng Chong[1*]
[1]*Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, Gambang, 26300 Kuantan, Malaysia*
[2]*Chemistry Department, Faculty of Science, Al–Azhar University, Assiut 71524, Egypt*
[3]*Centre for Clean Environment and Energy, School of Environment and Science, Gold Coast Campus, Griffith University, Queensland 4222, Australia*
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Tungsten oxides (WO_x) are widely studied as electrode material for energy storage applications, particularly in supercapacitors. Among the WO_x, the monoclinic $W_{18}O_{19}$ nanostructure is regarded as a promising electrode material for the next-generation energy storage device, due to its abundance of oxygen-vacancies for electrical conductivity. Due to its unique structure, Al^{3+} with high charge-per-ion offers excellence charge storage capabilities. Nonetheless, the high charge density of Al^{3+} ion typically manifests strong electrostatic interaction with the host material lattice, which can cause slow Al^{3+} ion diffusion and decrease its electrochemical performance. The current work describes the engineering of $W_{18}O_{19}$ structure for the highly conductive network that facilitates Al^{3+} ions mass transport. Solvothermal approach is used in this work to synthesize $W_{18}O_{49}$-rGO, from precursor WCl_6 and graphene oxide (rGO). It is found that rGO sheets provide a conductive platform for $W_{18}O_{49}$ nanowires growth and promote the formation of more oxygen vacancies in $W_{18}O_{49}$ nanowires, thus enhances the diffusion of Al^{3+} ions within the structure and increases the intercalation pseudocapacitance. The electroactive surface area is also enhanced by the addition of rGO sheets in $W_{18}O_{49}$-rGO nanocomposite. During charge/discharge process, the Al^{3+} ions intercalate/de-intercalate into $W_{18}O_{49}$ structure to cause the crystal plane contraction/expansion. The assembled supercapacitor device with $W_{18}O_{49}$-rGO nanocomposite as negative electrode and rGO as positive electrode, delivers high energy density of 28.5 Wh kg^{-1} and power density of 751 W kg^{-1}, suggesting the promising potential of $W_{18}O_{49}$-rGO nanocomposite for high-performance supercapacitors application.

Keywords: tungsten oxide; supercapacitor; graphene; energy storage

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EE-I-046

Kwok Feng CHONG

Professor Dr. Chong received his Bachelor of Science degree in 2004 from the Universiti Teknologi Malaysia, followed by a Doctor of Philosophy in 2010 from the National University of Singapore. His PhD. works focused on the development of carbon nanomaterials for biosensing application, supervised by Prof. Kian Ping LOH. In 2010, he went to Universiti Malaysia Pahang (UMP) as a Lecturer in Chemistry and was promoted to a Professor in 2021. Prof. Dr. Chong was appointed as Visiting Professor to Prince of Songkla University, Thailand from 2017-2022. He established carbon research group in UMP, to work on the application of carbon materials for energy storage and biosensor. His invention in energy storage supercapacitors received several awards internationally. He is also serving as the Chief Strategy Officer in Universiti Malaysia Pahang (UMP).

INVITED SPEAKER ABSTRACTS

IC

Inorganic Chemistry

IC-I-001

Molecular magnetic switches: Rational design of spin crossover materials

Raúl Díaz-Torres,[4] Eliseo Ruiz,[2] Guillaume Chastanet,[3] Phimphaka Harding[1] and David J. Harding[1]*

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[4] *Functional Materials and Nanotechnology CoE, Walailak University, Nakhon Si Thammarat, 80160, Thailand*
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Spin crossover (SCO) complexes can act as simple molecular magnetic switches and have the advantage of being switchable by multiple stimuli. A key aim in this area is to design molecules which switch reliably close to room temperature and with magnetic hysteresis. In this talk our recent efforts in the design of iron(III) spin crossover materials will be discussed with a focus on how the anion impacts magnetic behaviour both in the solid and solution state.

Keywords: spin crossover; magnetism; iron(III) complexes; hysteresis; sensors

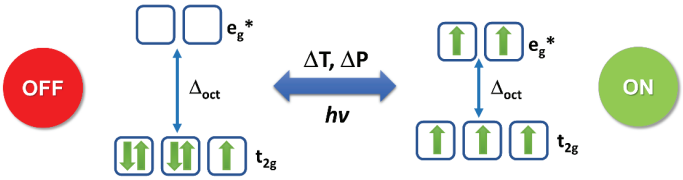

Figure 1 Overview of molecular switching in iron(III) SCO materials.

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IC-I-001

David Harding

My research interests are in the discovery of new materials with designed structural, optical and magnetic properties for molecular electronics. There are three specific areas of interest: spin crossover materials, single molecule magnets and crystal engineering.

1997-2000 Ph.D. in Inorganic Chemistry, University of Bristol

1993-1997 B.Sc. (Hons.) in Chemistry, University of Edinburgh

Honors and Distinctions

- Walailak University Researcher of the Year – 2020 & 2008
- Dalton Transactions New Talent: Asia Pacific Award – 2014
- Royal Society of Chemistry JWT Jones Travelling Research Fellowship -2010
- Fellow of the Royal Society of Chemistry – 2021
- Outstanding reviewer for Dalton Transactions – 2019 & 2021

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IC-I-005

Design and Characteristic Features of Electron-rich Boron-containing Cyclic Molecules

Rei Kinjo[1*]
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Since the first description by Lagmuir in 1919,[1] the concept of isosterism has been of paramount importance in inorganic chemistry as being a powerful strategy for the design and development of novel main group molecules. Among p-block elements, boron (B) and nitrogen (N) are isoelectronic with carbocation (C+) and anion (C–), respectively. Accordingly, the formal replacement of C=C units in organic molecules with B–N units leads to the corresponding hetero-compounds bearing similar geometric features but different electronic and chemical properties. Particularly interesting is the incorporation of B/N atoms into the aromatic ring scaffold of hydrocarbons as it may expand the diversity of aromatic molecules. In this presentation, a series of B,N-containing cyclic molecules developed in our research group will be overviewed (Figure). Its design, synthesis, structures, computational studies, and reactivity, as well as the recent relevant results, will be introduced.[2-9]

Keywords: isosterism; boron; aromatic; small molecule activation; Wade-Mingos' rules

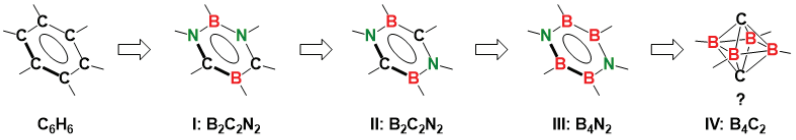

Figure. Schematic incorporation of B,N atoms into the aromatic scaffold for construction of B,N-containing molecules **I**-**IV**.

References

1. Langmuir, I. *J. Am. Chem. Soc.* **1919**, *41*, 1543.
2. Wang, B.; Li, Y.; Ganguly, R.; Hirao, H.; Kinjo, R. *Nat. Commun.* 2016, 7, 11871.
3. Wu, D.; Kong, L.; Li, Y.; Ganguly, R.; Kinjo, R. *Nat. Commun.* **2015**, *6*, 7340.
4. Wu, D.; Wang, R.; Li, Y.; Ganguly, R.; Hirao, H.; Kinjo, R. *Chem*, **2017**, *3*, 134.
5. Su, Y.; Do, D. C. H.; Li, Y.; Kinjo, R. *J. Am. Chem. Soc.* **2019**, *141*, 13729.
6. Su, B.; Ota, K.; Xu, K.; Hirao, H.; Kinjo, R. *J. Am. Chem. Soc.* **2018**, *140*, 11921.
7. Ota, K.; Kinjo, R. *Angew. Chem. Int. Ed.* **2020**, *59*, 6572.
8. Lu, W.; Do, D. C. H.; Kinjo, R. *Nat. Commun*. **2020**, *11*, 3370.
9. Zhu, L.; Kinjo, R. *Angew. Chem. Int. Ed.* **2022**, 61, DOI: 10.1002/anie.202207631.

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IC-I-005

Rei Kinjo

Academic Qualifications:

2007: PhD (Science), University of Tsukuba

2004: MSc (Science), University of Tsukuba

2002: BSc (Chemistry), University of Tsukuba

Work Experience:

2020 – Present: Full Professor, Nanyang Technological University (NTU)

2017 – 2020: Associate Professor, NTU

2011 – 2017: Assistant Professor, NTU

2007 – 2011: Research Fellow, University of California, Riverside

Research Interest: Main group chemistry and catalysis.

Selected Recent Awards/Recognition:

2022 National Research Foundation (NRF) Singapore Investigatorship Award

2022 Top 10% Outstanding Reviewers, Angewandte Chemie

2021 Nippon Shokubai Professorship in Chemistry

2021 Tokyo Chemical Industry-SNIC Industry Award in Synthetic Chemistry by the Singapore National Institute of Chemistry (SNIC)

2021 Top 5% Outstanding Reviewers, Angewandte Chemie

2020 Young Investigator, Journal of the American Chemical Society

2019 Federation of Asian Chemical Society (FACS) Distinguished Young Chemist Award

2019 Young Investigator, Journal of the American Chemical Society

2019 Asian Core Program Lectureship Award to Taiwan and China

2017 Outstanding Reviewer, Chemical Science

IC-I-013

Blueprint for a modern sustainable phosphorus chemistry

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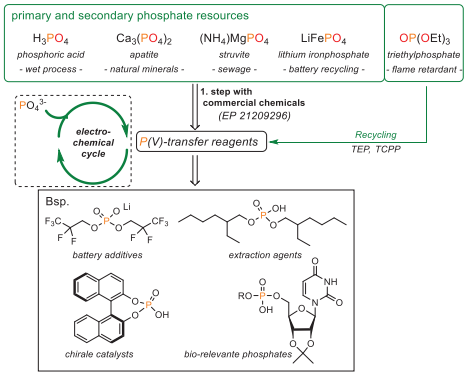
The current depletion of available primary phosphorus resources is extremely worrying, which is why phosphate rock and elemental phosphorus are listed as critical raw materials worldwide. So far, the value chain from phosphate ores to basic chemicals does not correspond to the guiding principle of "green chemistry". In addition, the problem of phosphorus recovery through suitable large-scale recycling processes to recover valuable phosphorus compounds will become drastically more acute in the future. For these reasons, the development of new and innovative chemical methods in the value chain of the important element phosphorus is urgently needed. In our blueprint for a modern sustainable phosphorus chemistry, we investigate systematic as well as atom and energy efficient ways to either directly convert P_4 via our concept of "*oxidative onioation*" selectively into salts of versatile P(III) transfer reagents suitable for subsequent formation of P-O, P-N and P-C bonds or the deoxygenation of phosphoric acid and recycled phosphate resources to P_1 building blocks,[1] allowing "redox neutral" synthesis of a variety of valuable P(V) compounds. Both concepts represent versatile and chlorine-free approaches to value-added and highly relevant phosphorus containing chemicals.

Keywords: sustainable chemistry; P_1-building blocks; primary and secondary phosphate resources; P(V)-transfer reagents



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IC-I-013

Prof. Dr. Jan J. Weigand

Jan J. Weigand obtained his Dr. rer nat. 2005 from the LMU in Munich. After the Bavarian culture prize 2005 he obtained a Lynen Scholarship from the AvH foundation for postdoctoral research (Dalhousie University, Halifax, Canada). With a "Lynen Return Fellowship" started his independent research at WWU Münster (2007). Shortly after, he was awarded the Liebig scholarship of the FCI which and in April 2010 he became fellow of the very prestigious Emmy Noether research program awarded by the DFG and obtained the Wöhler research award for young scientist. In July 2012 he received an "ERC starting grant" and since 2013, he is Professor at the TU University Dresden and is currently holds the Chair of Inorganic Molecular Chemistry. One of his main research interests is the development of new and sustainable synthesis routes to novel cationic and neutral phosphorus compounds and their use in synthetic applications of fundamental and industrial relevance. Furthermore, the group is involved in "solvent extractions", novel recycling strategies and technical chemistry applications.

IC-I-016

Creation of a variety of metallosupramolecular compounds based on gold(I) metalloligands with D-penicillamine

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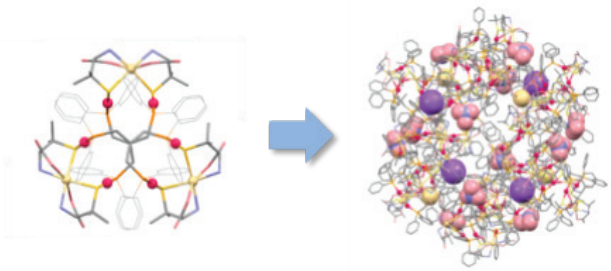
Heterometallic coordination compounds that contain more than one kind of metal ions and their supramolecular aggregates have attracted much attention in the fields of coordination chemistry and supramolecular chemistry. This class of compound is commonly synthesized via the one-step self-assembly of well-designed organic ligands in combination with a mixture of metal ions, which often results in the formation of undesired products. To overcome this problem, we have developed a metalloligand approach, in which a pre-designed metal complex with several donor sites is stepwise reacted with metal ions.[1] For example, we have shown that $[Au(D\text{-pen-}S)_2]^{3-}$ (H_2pen = penicillamine) acts as a multidentate metalloligand to produce a variety of polynuclear and supramolecular coordination compounds. Recently, this monogold(I) metalloligand system was extended to digold(I) and trigold(I) systems by introducing a digold(I)/trigold(I) linker with diphosphine/triphosphine ligands.[2] Here we present the coordination functionality of these metalloligands, which lead to the construction of unique metallosupramolecular architectures.

Keywords: coordination compounds; metallosupramolecules; metalloligand; gold(I)



References

[1] (a) Konno, T. *Bull. Chem. Soc. Jpn*. **2004**, *77*, 627-649 (Account).
(b) Igashira-Kamiyama, A.; Konno, T. *Dalton Trans*. **2011**, *40*, 7249-7263 (Perspective).
[2] (a) Yoshinari, N.; Konno, T. *Chem. Rec*. **2016**, *16*, 1647-1663.
(b) Takeda, H.; Kojima, T.; Yoshinari, N.; Konno, T. *Chem. Sci*. **2021**, *12*, 11045-11055.

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IC-I-016

Prof. Dr. Takumi Konno

TK received a Ph.D. degree in 1985 from University of Tsukuba. After working at University of Tsukuba and University of Cincinnati as a post-doctoral fellow, he became an assistant professor at University of Tsukuba in 1987. In 1997, he moved to Gunma University as an associate professor and was promoted to a professor in 1998. He was appointed as a professor at Osaka University in 2000. After retirement of Osaka University on March in 2022, he became a visiting professor at National Taiwan Normal University, as well as an emeritus professor of Osaka University. His research interest has been directed to fundamental coordination chemistry, and the research results have been published as more than 300 papers in international journals. He has been serving as a section editor of Chemistry Letters (Chemical Society of Japan) from 2013.

INVITED SPEAKER ABSTRACTS

IE

Industrial and Engineering Chemistry

IE-I-002

Green biohythane technology and its applications

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Hythane defined as a gas mixture of hydrogen (H2) and methane (CH4), which has been an attractive alternative vehicle fuel since the 1980s. Most of the hythane production processes in practice are adding H2 into CH4 but having disadvantages of using fossil-fuel-depended H2. Thus, since the 2000s, many studies have focused on a more sustainable process called two-stage anaerobic biohythane production (HyMeTek), in which biohydrogen and biomethane were separately generated in two digesters and then mixed together to obtain biohythane. The overall energy recovery resulted in remarkably higher (8-43%) for the two-stage in the huge majority of experimental conditions and never remarkably lower. These initial results should drive further research to better understand the conditions that can drive the two-stage anaerobic digestion to higher performance. The two-stage biohythane pilot plant was also used to assist Indonesian refugees who affected by climate change, provide farmers and refugees with sustainable energy, and solve the pollution caused by agricultural wastes. Biohydrogen research team at Feng Chia University used biowaste as a feedstock and built the world's first two-stage of biohydrogen and biomethane power plant in XinHeXing pig farm, Nantou, Taiwan, resolve the dilemma of food supply and waste treatment, and light up the world by turning the "brown into the new green"

Keywords: hydrogen; biohythane; anaerobic digestion; pilot plant; biowaste

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IE-I-002

Chen-Yeon CHU

Dr. Chen-Yeon Chu is Director for Institute of Green Products, Feng Chia University (FCU). He received his Ph.D. degree in 2005 from Chemical Engineering, Tsing Hua University, Taiwan. He got some of the academic awards e.g. Best Award in The 2013 International Capstone Design Contest on Renewable Energy Technology (CORE2013), Korea; FCU Excellent Research Awards (2010-2020); Best Paper Awards of Junior Session in International Conference of Young Scientists on Energy Issues (CYSEI-2011), Lithuania.; Best Paper Award of Taiwan Society of Environmental Engineering in Wastewater Treatment Division (2008). He serves as the secretaries of World Bio-HyLinks since 2006, IAHE-Taiwan Chapter since 2009. His research interests cover fermentative biohydrogen energy technology, green hydrogen energy technology and economy, green energy demonstration system of biological technology, talent training in biomass energy technology, hydrodynamic and kinetics in a fermenter system, bioreactor design and scale up with publication of 80 refereed journal papers and 15 patens.

IE-I-013

GC Journey to Net Zero

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PTT Global Chemical Public Company Limited (GC), along with its subsidiaries and affiliates as "**GC Group**" announced its ambitious "**Together To Net Zero**" commitments to a sustainable future, significantly raising its medium-term targets to reduce current greenhouse gas emissions by 20 percent by 2030 on its journey way to achieving Net Zero by 2050.

The Low Carbon Transition Framework is central to GC's global transformation to achieving Net Zero by 2050, driven by three core pillars.

1) **Efficiency-driven**, maximizing efficiency across all assets – guided by the "5Rs" principle and digitalization – while utilizing existing and adopting new low carbon technologies, as well as increasing the use of low carbon power and low carbon processes, to further accelerate greenhouse gas reduction.
2) **Portfolio-driven**, expanding GC Group's product and application portfolio through innovation and investment. This includes transitioning its portfolio to low carbon businesses, including high- value performance chemicals, as well as businesses in bio, green, and circularity
3) **Compensation-driven**, which focuses on the implementation of nature-based solutions, while continuing to incubate and invest in new carbon capture technologies through multiple approaches including corporate venture capitals, partnerships, and joint venture initiatives to make the transformation economically viable.

Keywords: GC; Net Zero

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IE-I-013

Napaporn Ratanapoka, Ms.

Education:

1993-1996: Master Degree of Chemical Engineering, Chulalongkorn University

1989-1993: Bachalor Degree of Science (Chemistry), Kasetsart University

Work Experienced:

Total 25+ years Experienced in Refinery (Complex refinery: 148kbd crude + 57kbd Condensate Residue distillate capacity, located in Rayong), PTT Global Chemical PCL.

Oct 2019 – now: Vice President Refinery*

2011- Sep 2019 (8.5 yrs): Refinery Technical Manager: Leading, coaching, and developing 8-12 Process Engineers

2008-2011 (2.5 yrs): Refinery Lead Process Engineer – Hydroskimming and Utilities

2006-2008 (2 yrs): Leading Process engineer team for the 1st Major expansion project, "Refinery Upgrading and Clean Fuel project"

2005-2006 (1.5 yrs): work as Refinery Economist in Supply&Planning i.e. run LP and production planning.

1997-2004 (8 yrs): start working as Process Engineers for various process units (on rotation basis)

***Current responsibility:**

- Strategic drive Refinery to meet business plan for maximize profit, while maintain safety in operation, maximize efficiency and prevent any impact to environment and community.
- Manage and control on Asset Management to ensure high Reliability and maximum utilization of asset.
- Control and manage on People for manpower and also competency development of team.
- Drive organization for meet all rules and regulation, also company policy and applied Industry standards.

IE-I-014

Hydrogen : Energy for the Future

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The global direction is heading to “Carbon Neutrality” and “Zero Carbon Emission” from Conference of the Parties (COP) meetings and Sustainable Development Goal (SDG). Worldwide efforts are moving toward greater utilization of renewable energy such as solar PV, wind energy, energy storage and electric vehicle, hoping to tackle the Global temperature rise to be within 1.5 degrees Celsius. Hydrogen has been regarded as a carbon-free energy carrier. It can be utilized in several sectors i.e., power, transport and energy storage. However, the source of hydrogen can be varied, hence a carbon emission of each hydrogen production is different. Prices of hydrogen also depend on the source of hydrogen production which has been given various colours. Details of hydrogen as energy for the future will be presented from R&D and commercial aspects.

Keywords: hydrogen; energy for the future

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IE-I-014

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Education

1991-1994	B.Eng Material Science	University of London, England
1994-1998	Ph.D. Material Science	University of London, England

Work experiences

Since 1998, Sumittra joined National Metal and Materials Technology Center, NSTDA, Thailand as a researcher. Between 2010 - 2020, she was appointed Materials for Energy Research Unit Director (RUD). When National Energy Technology Center (ENTEC), NSTDA, Thailand was established on the 1st October, 2020, she had become Director of Energy Innovation Research Group and from the 1st May, 2022 as the Executive Director of ENTEC. She has supervised/co-supervised more than 23 MSc/PhD students from Chulalongkorn University, King Mongkut's University of Technology Thonburi, Mahidol University, Thammasart University and TAIST Tokyo Tech programme. Further from fundamental research, she has also collaborated with industry to work on near-market research. Other than research work, she has also served as technical reviewer in several international journals related to hydrogen, electrochemistry and material science and engineering and as technical committee of conferences and symposia. Another part of work includes organizing networking symposium i.e., UK-South East Asia Partnership in Science in the topic of Fuel Cells from 2007 to 2011.

Research interest

Her main areas of research are hydrogen production, Solid Oxide Fuel Cells, catalysis and sorbents, fabrication of ceramic film and materials characterization. She has over 50 publications in international journals, 11 articles in national journals, 72 presentations in international conferences, and 42 presentations in national conferences. For intellectual properties, she has over 23 patents (pending/filing) and 6 trade secrets.

Awards

Bronze medal from The 35th International Exhibition of Inventions, New Techniques and Products of Geneva, 22 April, 2007, Geneva, Switzerland, "DC 4-point Van der Pauw Sample Holder".

IE-I-017

Driving innovations for sustainable waste management with extended producer responsibility

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The global economy is only partially circular. The linear economy wastes tremendous number of materials in production and consumption. Waste management is the weakest link in a product's life cycle. The conventional organization of waste management is no longer working. Municipalities are struggling to cope with complex waste products. The situation is much worse in developing countries with poor service coverage and improper handling of waste. Leakages like greenhouse gas emissions from landfill or plastic pollution in the ocean have caused devastating environmental consequences. In order to create a more circular economy, we have to change the responsibility structure. The producers should be obliged to integrate the end-of-life management when designing a product system. The extended producer responsibility (EPR) laws have been a driver for chemistry innovations that promote collection and greater recycling of used products in industrialized countries. Despite challenges in developing economies, a renewed interest in EPR has already led to some promising results and holds much potential for sustainable waste management.

Keywords: product stewardship; circular economy; recycling; plastic pollution; Sustainable Development Goals

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IE-I-017

Panate Manomaivibool

Dr. Panate Manomaivibool obtained his Doctor of Philosophy in Engineering (Industrial Environmental Economics) from IIIEE, Lund University, Sweden in 2011. He is an assistant professor and head of CEWT Research Center at the School of Science, Mae Fah Luang University. He has done extensive work on circular economy, solid waste management, and sustainable tourism. He received a research award from the National Research Council of Thailand in 2016 and an excellence in review award from Resources, Conservation & Recycling in 2018.

IE-I-018

Bio-$CaCO_3$ from green mussel shells: A high value blue-material from seafood waste

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Aquaculture of green mussel (*Perna viridis*) along the gulf of Thailand shoreline is important and beneficial to local economy. The natural abundance, growth performance, and inexpensive aquaculture technique made the green mussel a viable source of inexpensive protein with high nutrition value. The annual production of Thai green mussel is approximately 70,000 tons. Approximately 60% of the total production (42,000 tons) is the shell waste. The green mussel shell is considered an agricultural waste and normally discarded by landfill. Although 95% of the green mussel shell is pure aragonite calcium carbonate with trace amount of calcite calcium carbonated covered by green periostracum (protein and chitin), currently there is no appropriate technology for harvesting the aragonite calcium carbonate with economic and environmental benefit. We have developed a mechanochemical technique capable of transforming the stratified aragonite calcium carbonate in green mussel shell into macro-, micro-, and nano-calcium carbonate that can be employed in decoration, agriculture, construction, coating, and environmental remediation.

The aragonite pseudohexagonal plate (300-500 nm thick and 3-5 μm diameter) were extracted from the shells using green process without creating chemical waste. The alkaline byproduct with dissolved periostracum can be processed and transform into liquid fertilizer. This seafood waste management protocol via green technology could transform green mussel shells into bio-calcium carbonate of high economic value while support the sustainable development goal (SDG) in the local and global scale. Several applications of the green-mussel-shell-derived bio-calcium carbonate will be demonstrated.

Keywords: *Perna viridis*, green mussel shells; waste management; zero-waste; bio-calcium carbonate, nano-calcium carbonate

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IE-I-018

Sanong Ekgasit

Sanong EKGASIT, a professor of chemistry, received his B.Sc. degree in chemistry and his M.Eng. in polymer technology from Chulalongkorn University, Thailand in 1989 and 1992, respectively, and received his Ph.D. in polymer science and engineering from Case Western Reserve University, USA in 1996. He has been working at the Department of Chemistry, Faculty of Science, Chulalongkorn University since 1999. He was an Alexander von Humboldt Research Fellow at Max-Planck Institute for Polymer Research at Mainz, Germany in 2003/2004. His research interests include molecular spectroscopy, nanomaterials (synthesis, modification, and commercialization), cellulose nanocrystals (synthesis and applications), and lab-on-phone research. His current research is focusing on the fabrication and utilization of bio-calcium carbonate from green mussel shell for agriculture, environment, and waste management applications.

INVITED SPEAKER ABSTRACTS

MN

Material Chemistry and Nanotechnology

MN-I-002

Fundamental science and the pressing need for battery electrolytes for Thailand

Olivier Fontaine*
Molecular Electrochemistry for Energy Laboratory, Vistec, Rayong, Thailand
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We are currently undergoing an unprecedented shift of technology for both personal and industrial transportation: **The electric vehicle revolution!** What started as an array of humble academic research projects in the 1970-80s quickly gained momentum and caught the interest of technology company Sony who produced the first commercial Li-ion battery in 1991. The seeds of the electric vehicle revolution where sown with the advent of environmental disasters associated to greenhouse gases, geopolitical tension linked to fossil fuels and the ever-growing health problems associated with internal engine combustion products. National and international political organisations have put into place electrification targets, support structures, investment programmes and infrastructure in order to drive this change. Within this surging economic landscape, Li-ion battery component manufacturers are in a unique position to profit from the electric vehicle revolution.

Recently, Thailand has announced ambitious plans to produce 30% electric cars in 2030. This represents 725.000 battery powered cars. As to achieve this target Thailand will need to procure – among other things – all the necessary materials to produce these Li-ion batteries. Not only is the volume of raw materials huge but the quality must also be extremely high as the longevity and safety of the battery depends on the purity of the battery components. On such component is the electrolyte: the liquid at the very heart of Li-ion batteries. We have estimated that Thailand must produce 17.000 tons of electrolyte to meet its target.

This raises some interesting questions some scientific and some economic. Firstly, what is in this electrolyte and what is its role? Secondly, which companies in Thailand are currently producing this electrolyte? Does Thailand possess the raw materials necessary to make this electrolyte? And which countries and companies are pioneers in this industry? Our state-of-the art research group is specialised in developing and characterising battery electrolytes and is currently tackling these questions. In this talk, I will address all the question above and describe what steps are needed for Thailand to adapt and thrive within this new global transport economy.

Keywords: Li and Post- lithium ion battery, Electrolytes, fundamental Electrochemistry.

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MN-I-002

Fontaine Olivier

I am associate professor at Vistec Institute, with a dual research profile in fundamental electrochemistry and chemistry of nanomaterials. After my doctorate studies in molecular electrochemistry, I earned multidisciplinary expertise through two post-doctorate positions at the **College de France** (Prof. Clément Sanchez) and the **University of St Andrews** (Prof. Peter G. Bruce, now Prof. in Oxford University). I have started my young independent research as an Assistant Professor of Chemistry at the **University of Montpellier**, Institut Charles Gerhardt Montpellier, France. As proof of the quality of my research, I have as collaborator the Prof. J-M. Tarascon (Collège de France) and P. Simon (Toulouse University). From October 2020, I have been appointed to the **Institut Universitaire de France** as member Junior. In 2018, I was awared by the presitigious La **Recherche Prize**, on the achievement concerning new generation of Electrolytes.

MN-I-008

Safe-By-Design for Nanomaterial Safety: An emphasis on Surface Chemistry

Mustafa Culha

Department of Chemistry and Physics, Augusta University, GA, USA
Sabanci University Nanotechnology Research and Application Center (SUNUM), Istanbul, Turkey

Safety of nanomaterials is a major concern, since they are widely used in a range of applications through several fields. Although they offer unique opportunities with their extraordinary physiochemical properties, they may cause serious health and environmental problems depending on their type and exposure routes. There is now a general consensus about the parameters influence their adverse effects. Their size, shape, chemical nature, and surface chemistry are considered as major players. In order to develop safe and functional engineered nanomaterials (ENMs) and nano-enabled products (NEPs), their safety concerns should be carefully evaluated. Thus, the Safe-by-Design (SbD) concept in their applications has increasingly been implemented. In this talk, the SbD concept for nanomaterial safety by emphasizing the nanomaterial surface chemistry is presented and discussed. Data presented in this talk comes through two European Commission supported projects, Nanomicex and Safe-by-Design for Nano (SbD4Nano). The author greatly acknowledges the funding through these projects.

Keywords: Nanomaterials, nanotoxicity, nanosafety, safe-by-design

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MN-I-008

Culha

Dr. Culha is currently affiliated with Augusta University, USA, Sabanci University Nanotechnology Research and Application Center, Istanbul, Turkey, and Morsani College of Medicine of the University of South Florida, USA. His current research interest includes elements from chemistry, medicine, material science, photonics, and nanoscience and nanotechnology. He and his colleagues have authored of more than 130 papers in refereed international journals, several book chapters and patents in the area of analytical and bioanalytical chemistry, and nanobiotechnology. He is the president-elect for The Federation of Asian Chemical Societies (FACS) for 2023-2025.

MN-I-013

Flexible Thermoelectric Generator from Bacterial Cellulose/Ag2Se Nanocomposites

Supree Pinitsoontorn[1,*], Dulyawich Palaporn[1], Wiyada Mongkolthanaruk[2], Kajornsak Faungnawakij[3], Sora-at Tanusilp[4], and Ken Kurosaki[4]

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[3]*National Nanotechnology Center, National Science and Technology Development Agency, 111 Thailand Science Park, Pathum Thani, 12120, Thailand.*

[4]*Institute for Integrated Radiation and Nuclear Science, Kyoto University, 2, Asashiro-Nishi, Kumatori-cho, Sennan-gun, Osaka 590-0494, Japan.*

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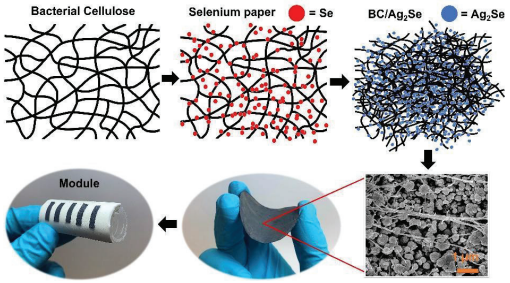
In this research, a flexible thermoelectric paper was fabricated from bacterial cellulose/silver selenide (BC/Ag_2Se) nanocomposites. Ag_2Se particles were *in situ* synthesized in the network of BC nanofibers. Several synthesis parameters that crucially affect the formation of Ag_2Se particles in the BC structure were investigated to understand the phase formation mechanism. Under the optimized conditions, the BC/Ag_2Se paper with a large proportion of Ag_2Se up to 75 wt.% was successfully obtained. The *in situ* synthesis limits the Ag_2Se formation within the nanopores of the BC structure. As a result, the sub-micro size Ag_2Se particles with narrow size distribution were homogeneously dispersed in the BC nanofiber network. The microstructure was further improved by hot-pressing, which increase the density of the BC/Ag_2Se paper and make the BC layered structure more compacted. These contributed to a significant enhancement of the thermoelectric properties, with the electrical conductivity of 23000 S/m and the Seebeck coefficient of -167 μV/K at 400 K. The power factor was 642 $\mu W/mK^2$ at 400 K, a very high value compared to other flexible thermoelectric research. The measurement of thermal conductivity yielded the κ value of 0.36 W/mK at 400 K, which led to the maximum *ZT* of 0.70 at 400 K. To demonstrate the thermoelectric conversion, five BC/Ag2Se paper pieces were connected in series to construct a thermoelectric module. The module is very flexible and can be curved to attach to any arbitrary shape of the hot/cold surfaces. In addition, the process for fabricating the BC/Ag_2Se paper is scalable without any use of advanced or expensive instruments. This makes it a very attractive choice as a flexible TEG.

Keywords: flexible thermoelectric; Ag_2Se; bacterial cellulose; nanocomposite;



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MN-I-013

Supree Pinitsoontorn

Supree Pinitsoontorn received his D.Phil in Materials from Department of Materials, University of Oxford, UK, in 2008. He is currently working as an Associate Professor in Physics at Khon Kaen University, Thailand. His research interests include thermoelectric materials, magnetic nanoparticles, and bacterial cellulose nanocomposites. He has authored over 140 articles and has an h-index of 24 (Scopus).

MN-I-025

Water Soluble Quaternized Cyclodexrin grafted Chitosan: Synthesis, Properties, and Its Potential Drug Delivery Application

Uracha Rungsardthong Ruktanonchai[1,*], Sarunya Phunpee[1], Pattarapond Gonil[1], Suvimol Surassmo, Warayuth Sajomsang[1], Apinan Soottitantawat[2], Sakhiran Sakulwech[1], Nattaya Lourith[3,4], Mayuree Kanlayavattanakul[3,4]

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Self-assembly of amphiphilic polymers provides a simple and low-cost method to produce well-defined nanoparticles for drug delivery. The fact that most amphiphilic polymers are derived from synthetic polymers, biodegradability is limited. Chitosan (CS) is attractive as it shows biocompatibility and biodegradability, and its chemical structure contains reactive functional groups, i.e., amino group and hydroxyl group, for further modifications. Herein, we propose water soluble quaternized β-cyclodexrin grafted CS (QCD-g-CS). By grafting β-CD moieties on CS and quaterning CS with glycidyltrimethyl ammonium chloride, QCD-g-CS can be obtained. QCD-CS exhibited 1.) self-aggregated formation, and 2.) positive charges along CS backbone. These lead us not only to encapsulate and control release hydrophobic drugs, i.e., menthol, eugenol, but also to bind with negatively charged molecules, i.e., hyaluronic acid, mucin. The presentation covers the synthesis, detailed structure analysis, the properties of self-assembled structure, and possible applications relying on its ability.

Keywords: β-cyclodextrin; Chitosan; Self-assembly; Inclusion complex; drug delivery

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MN-I-025

Uracha Rungsardthong Ruktanonchai, Ph.D.

Executive Vice President of National Science and Technology Development Agency (NSTDA) and Principal Researcher

Dr. Uracha R. Ruktanonchai pursued her Ph.D from School of Pharmacy (Advanced Drug delivery), University Of Nottingham, UK in 2002. During 2002-2003, she was a post-doctoral research fellow at School of Biomedical Sciences, Queen's Medical Center, University of Nottingham working on Biomaterial research. Dr. Ruktanonchai has taken a researcher position at the National Nanotechnology Center (NANOTEC), National Science and Technology Development Agency (NSTDA), Thailand in 2004. Currently, she is a Principal researcher and Executive Vice President of National Science and Technology Development Agency (NSTDA). Her research expertise is based on encapsulation technology to control release and target bioactive compounds for Drug delivery focusing on lipid dispersion, biocompatible polymeric nanoparticles and functionalized nanoparticles. Dr. Ruktanonchai has published research findings in more than 120 international publications (H-index 41) with more than 50 IP applications. She also serves as an advisor, invited speaker and guest lecturer for various universities and conferences domestically and internationally. She was awarded a "Young Scientist of 2010" from the Foundation for the Promotion of Science and Technology under the Patronage of His Majesty the King, "2011 For Women in Science" fellowship from UNESCO-L'Oreal Thailand. In 2015 She has been appointed to be Adjunct Professor of Asian Institute of Technology, Thailand. In 2017 she has been selected to be a Fellow of the Royal Society of Chemistry (FRSC), UK and appointed to be Honorary Professor by University of Queensland, Australia. She has been awarded the prestigious UK alumni Award under the category of Professional acheivement from the British council and UK Embassy, Thailand in 2018. Since 2020 she has been listed top 2% of the mosted cited scientist in the field of Pharmacy & Pharmacology, Elsevier database and Standford University. She is now serving as one of editorial board member of FRONTIERS: Experimental Pharmacology and Drug Discovery since 2021 and board member of Faculty of Pharmacy, Thammasat University since 2020.

MN-I-028

Nitrogen and oxygen doped vertically aligned carbon nanotubes (VACNT) for high-energy ultracapacitors

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Owing to their surface area, anisotropy and good electrical conductivity, Vertically Aligned Carbon Nanotubes carpets (VACNT) are promising materials for ultracapacitor electrodes exhibiting high specific power. To obtain low cost, highly conducting and light electrodes, we have developed a single-step process to synthesize VACNT on aluminum current collectors which is compatible with industrial requirements: the Aerosol Assisted Catalytic Chemical Vapor Deposition [1], [2]. This method provides long, dense and clean VACNT with height between ten and hundred µm and densities between 80 and 200 mg/cm^3. Nevertheless, VACNT show some limitations on both gravimetric and volumetric energy (5 Wh/kg and 1 mWh/cm^3). To improve electrodes capacitances we have developed an easy method based on electrodeposition of electronic conducting polymer (ECP) in order to combine VACNT with ECP [3-4]. We are also looking to VACNT doping with heteroatoms such as N and O by two paths: direct growth of doped VACNT and post synthesis treatment. We will present first results on controlled direct growth of VACNT containing nitrogen on Si substrates and on VACNT/Al doped with N and O prepared by post VACNT synthesis vapor phase treatment. We will focus on the control of their characteristics (length, diameter, density, doping rate) and their electrochemical performances as ultracapacitors electrodes. The N@VACNT from direct growth are few walled "bamboo" shaped nanotubes with a nitrogen weight content of 4.5%. The doped VACNT/Al from post-synthesis treatment have an oxygen atomic content up to 16.2% and nitrogen atomic content up to 6.6%. The electrode capacitance was increased up to 102 F/g and the specific energy to 13.7 Wh/kg.

Keywords: Supercapacitors; N-doped VACNT; O-doped VACNT; Energy storage

[1] M. Pinault et al, Nano Lett., 2005.
[2] M. Delmas et al, Nanotechnology, 2012.
[3] S. Lagoutte et al, Electrochimica Acta, 2014.
[4] T. Vignal et al, Electrochimica Acta, 2020.

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MN-I-028

Banet Philippe

Dr. Philippe Banet is Associate Professor at Laboratory of Physicochemistry of Polymer and Interfaces (LPPI) at CY Cergy Paris University (CYU) in France. He's an engineer graduated from Ecole Nationale Supérieure de Chimie et de Physique de Bordeaux in 2001 and he received in 2004 his PhD degree in chemistry from University of Montpellier. After postdoctoral positions in Pr. Moreau's group in ENSC Montpellier and Dr. Tran-Thi's group in CEA-Saclay he joined the CYU in 2007. He works on polymers and nanomaterials in the field of electrochemical biosensors and energy storage devices. His research deals with (bio) functionnalization of electrodes or surfaces by various methods: self-assembled monolayers, electrochemical deposit, hydrolysis condensation... Moreover, he is interested in the use of nanomaterials (metallic nanoparticles, carbon nanotubes) to develop new sensing transduction process in order to enhance the sensitivity of electrochemical biosensors and to increase performances of supercapacitors.

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MN-I-032

Spin-correlated photoluminescence of open-shell molecules

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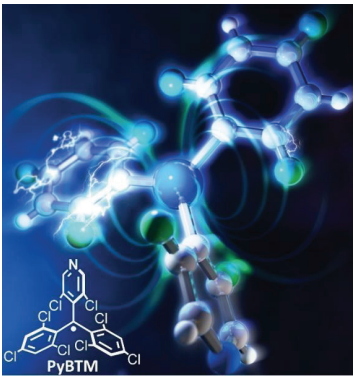
Stable organic radicals have long been considered as non-emissive or highly light-sensitive species. Recent developments of luminescent radicals have revealed their unique emission characteristics based on the doublet states, such as efficient exciton generation in electroluminescent devices and the absence of heavy atom effect.[1] We have developed a highly photostable luminescent radical PyBTM.[2] The photofunctions of PyBTM can be enhanced by coordination to metal ions; for example, the photoluminescence quantum yield, fluorescence wavelength, and stability in the photoexcited state all increase upon coordination to Au^{I}.[3] One of the important challenges that remain unexplored in the studies of luminescent radicals is to develop photofunctions based on the interplay between spin and luminescence, which are difficult or impossible for conventional closed-shell molecules to achieve. We have shown that radical-doped molecular crystals and radical-based coordination polymer crystals demonstrate magnetic-field-controlled luminescence (magnetoluminescence, MagLum) as novel spin-correlated luminescence properties.[4-6] These findings propose that the spin degree of freedom in the ground state of open-shell molecules can be a key to achieving spin-correlated photofunctions.

Keywords: radical; luminescence; spin; doublet; solid-state emission



References

[1] Kusamoto, T.; Kimura, S. *Chem. Lett*. **2021**, *50*, 1445. [2] Hattori, Y.; Kusamoto, T.; Nishihara, H. *Angew. Chem. Int. Ed.* **2014**, *53*, 11845. [3] Hattori, Y.; Kusamoto, T.; Nishihara, H. *Angew. Chem. Int. Ed.* **2015**, *54*, 3731. [4] Kimura, S.; Kusamoto, T.; Kimura, S.; Kato, K.; Teki, Y. *Angew. Chem. Int. Ed.* **2018**, *57*, 12711. [5] Kimura, S.; Kimura, S.; Kato, K.; Teki, Y.; Nishihara, H.; Kusamoto, T. *Chem. Sci.* **2021**, *12*, 2025. [6] Kimura, S.; Matsuoka, R.; Kimura, S.; Nishihara, H.; Kusamoto, T. *J. Am. Chem. Soc.* **2021**, *143*, 5610.

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MN-I-032

Tetsuro Kusamoto

Tetsuro Kusamoto received his Ph.D. degree in 2010 from the University of Tokyo. He spent next two and a half years as a postdoctoral researcher and a special postdoctoral researcher at RIKEN. After he spent six years as a project assistant professor and an assistant professor at the University of Tokyo, he began his independent academic career in 2019 as an associate professor at the Institute for Molecular Science, National Institutes of Natural Sciences. He is passionate about developing novel photo-electro-magneto functions based on open-shell molecular materials.

MN-I-048

Stretchable and transparent conductive PEDOT:PSS-based electrodes for organic photovoltaics.

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We report the development of conducting, transparent, and stretchable electrodes based on PEDOT:PSS using an innovative approach that combines an interpenetrated polymer network-based on polyethylene oxide and the surfactant Zonyl. The latter improves the ductility of PEDOT:PSS and enables the deposition on hydrophobic surfaces such as PDMS elastomer, while the presence of a three-dimensional matrix offers high electrical conductivity, elasticity, and mechanical recoverability. The resulting electrode exhibits attractive properties such as high electrical conductivity of up to 1230 $S.cm^{-1}$ while maintaining high optical transparency of 95% at 550 nm. The potential of our electrode technology is demonstrated with the application in indium-tin-oxide (ITO)-free solar cells using PBDB-T-2F:IT-4F blend with a power conversion efficiency of up to 12.5%[1]. The impact of repeated stretch-and-release cycles on the electrical resistance was also examined in our effort to evaluate the properties of the electrodes. The interpenetrated morphology of the PEDOT:PSS and polyethylene oxide network are found to exhibit beneficial synergetic effects resulting in excellent mechanical stretchability and high electrical conductivity[2]. By carefully tuning the amount of additives in the electrode, we demonstrate the ability to detect small changes in electrical resistance as a function of mechanical deformation, which enables the demonstration of stretchable and resilient on-skin strain sensors capable of detecting small motions of the finger.

Keywords: Organic Solar cells; stretchable, PEDOT:PSS

[1] E. Dauzon et al, Advanced functional Materials, 30(28), 2020; https://doi.org/10.1002/adfm.202001251
[2] E. Dauzon et al, Advanced Materials, online version 2021, https://doi.org/10.1002/adma.202101469

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MN-I-048

Fabrice Goubard

Research activities of Fabrice Goubard, full professor in Laboratory of physical-chemistry of Polymer and Interfaces (LPPI) at CY Cergy Paris Université, (France) are focused on the elaboration of functional hybrid nanomaterials for different applications. In photovoltaic domain, his study concerns mainly both stretchable solar cells and n-p interface between a mesoporous metal oxide and a conjugated polymer (or p-type molecule) in perovskite solar cells. Molecular engineering versus optoelectronic applications constitutes also one of his main subjects. He is currently the co-author of more than 120 publications and supervise four on going doctoral thesis.

MN-I-049

Advanced porous materials synthesized by template method

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This talk will introduce advanced porous materials recently developed by template synthesis. The first topic is nanoporous materials with single-graphene walls, graphene mesosponges (GMS) [1]. There are many publications describing "graphene porous materials" and "three-dimensional (3D) graphene materials". However, most are materials with stacked graphene walls or materials with macropores rather than micro/mesopores. By contrast, GMS possesses unique properties such as developed mesopores, oxidation resistance[2], high conductivity, and mechanical flexibility[3]. Thus, GMS is expected to have a variety of applications, including supercapacitors[2], lithium-ion batteries, fuel cells[4], heat pumps [3], and catalyst supports. The second topic is the synthesis of MOF-like ordered carbon materials called ordered carbonaceous frameworks (OCFs). Recently, the carbonization of crystalline materials like metal-organic frameworks (MOFs) has been intensively investigated, whereas only amorphous carbons have been synthesized. We have discovered a way to synthesize ordered carbonaceous frameworks (OCFs) that retain the structure regularity and molecular blocks of the precursor organic crystal[5,6]. OCFs are the hybrid of crystalline materials like MOFs and carbon materials, and we are developing new catalysts with atomically defined active sites. The third topic is the development of honeycomb monoliths with tiny channel sizes (1 to 200 μm) called microhoneycombs. When a solid/water mixture with appropriate rheology is unidirectionally frozen at a constant rate, uniform-sized ice rods are grown pallarelly to the freezing direction, and subsequent freeze-drying yields microhoneycombs [7]. We have discovered a powerful structure-directing function of cellulose nanofibers, enabling the inclusion of various materials in the honeycomb walls [8]. This talk also mentions an advanced temperature-programmed desorption (TPD) technique up to 1800 °C with very high detection sensitivity. The advanced TPD enables quantifying the number of graphene edge sites in any carbon materials, including graphite and carbon nanotubes, at a ppm level [2, 9]. The TPD data makes it possible to estimate the average graphene-domain size and precise average stacking number.

References

[1] H. Nishihara, et al., Adv. Funct. Mater., 26, 6418-6427 (2016).
[2] K. Nomura, et al., Energy Environ. Sci., 12, 1542-1549 (2019).
[3] K. Nomura, et al., Nat. Commun., 10, 2559 (2019).
[4] A. Ohma, et al., Electrochim. Acta, 370, 137705 (2021).
[5] H. Nishihara, et al., Nat. Commun., 8, 109 (2017).
[6] T. Yoshii, et al., Chem. Commun., 58, 3578 (2022).
[7] Z.-Z. Pan, et al., Bull. Chem. Soc. Jpn., 95, 611 (2022).
[8] Z.-Z. Pan, et al., ACS Nano, 10, 10689 (2016).
[9] R. Tang, et al., J. Mater. Chem. A, 7, 7480 (2019).

Keywords: three-dimensional graphene; batteries; carbon alloys; single-metal catalysts; honeycomb materials

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MN-I-049

Hirotomo Nishihara

Dr. Hirotomo Nishihara received his Ph.D. from Kyoto University in 2005. Soon after getting his Ph.D., he became an Assistant Professor at Tohoku University. He was then promoted to Associate Professor in 2011. In 2017, he stayed at the University of Calgary as an invited professor to work with Professor George Shimizu. In 2020, he was promoted to full Professor at Tohoku University.

His research interests include porous materials, carbon materials, adsorption, supercapacitors, hydrogen storage, lithium-ion batteries, and fuel cells. He discovered mechanically responsive graphene-based nanoporous materials and received the German Innovation award 2020, the JSPS award 2020, and was selected as the Asian Scientist 100 in 2020. He established a startup company, "3DC," to industrialize his carbon materials in 2022 and participate as a CTO.

MN-I-056

Research on Effect of hybrid eco-reinforcement on mechanical properties of Polypropylene matrix composites

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Polymer based composites are drawing industrial attention for engineering applications due to their excellent strength to weight ratio, specific strength, specific modulus, lightweight, and self-lubrication. Further, natural fiber and hybrid reinforcement bringing the polymer composites into next level that is highly essential and satisfying the industrial requirement. Therefore, current research focused on development of hybrid composites by utilizing uni-directional flax fibers (LFF) as primary and short (6mm) basalt fibers (BF), and powder (~1.6 to 79.4 micrometer) rice husk (RHP) as supportive reinforcement to polypropylene (PP) matrix. The hybrid composites (LFF/BF/RHP-PP) were obtained through stepwise manufacturing processes such as extrusion, compression, and injection molding to prepare the BF/RHP-PP composites pellets (2 mm), LFF/BF/RHP-PP composite strips (10 mm) and LFF/BF/RHP-PP composite, respectively. The effect of hybrid reinforcement on the mechanical, thermal, and flame-retardant properties of PP was studied. The hybrid composites were showed a significant improvement in tensile strength and modulus by 36.64 % and 42.29 %, respectively (Fig. 1), than LFF/PP composite due to the support of BF with high strength and modulus, and RHP system as reinforced space of LFF and filler void in structural of hybrid composites making the bonding become betters in structural of hybrid composites and the stress load transfer from matrix to different fibers/fillers also better. Similarly, the thermal stability improved by 19%, and the flammability property is enhanced by decreasing the pHRR and THR to 48 and 4% respectively.

Keywords: flax fibers; rice husk powder; basalt fibers; polypropylene; green composites

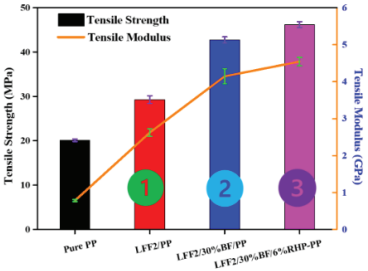

Fig. 1 Tensile results of PP hybrid composites

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MN-I-056

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Professor Song has over 27 years of experience on natural fiber composites, structural analysis and reliability tests of structure and biomedical rehabilitation engineering. Currently focused on developing Nano-engineered fiber-reinforced composites, Hybrid fiber-reinforced composites, Nano-engineered composites, Natural fiber, and bio-based composite material. He has guided more than 5 doctoral and 15 postdoctoral fellows. He is author and co-author of more than 250 papers in peer reviewed international journals. Professor Song has 12 domestic and 4 International (USA) patents. He has delivered more than 50 keynote/plenary/invited lectures at different conferences and technical gatherings around the world, has been serving as an Editorial Advisory Boards of two domestic journals, and is a reviewer for over 350 international scientific journals. Currently working as a Director of Eco-friendly hybrid flame retardant composites center funded by National Research Foundation of Republic of Korea.

MN-I-062

Electrochromic devices with stacked cyan, magenta and yellow pixels architecture

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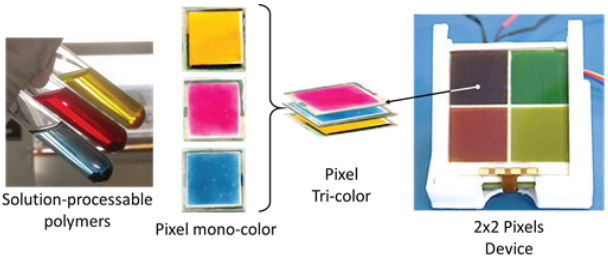
Reproduction and color change can be achieved by many display technologies. Among them, organic light emitting diodes (OLED) or liquid crystals displays (LCD), based on light emission, know a significant commercial development in TV screens or smartphones. On the other hand, for the non-emissive technologies, the colors are obtained by selective absorption and diffusion from an incident light source, usually that of the day. Currently, many non-emissive technologies are being developed such as cholesteric liquid crystals, electrowetting or electrophoretic materials. They have the great advantage of being less energy intensive than emissive technologies. Electrochromic materials (inorganic oxides[1], organic molecules[2] or electrochromic polymers (EP)[3]), capable of changing colors under the effect of an electrical stimulus, can also be used in the development of a color reproduction system. Here we described the conception of a device with original stacked architecture capable of reproducing a wide range of colors. For this, we stack three colorimetric pixels based on electrochromic polymers with the three primary cyan, magenta and yellow (CMY) colors. So, we propose and discuss three new architectures in which the CMY glass pixels are superimposed in a single device.

[1] C. G. Granqvist, *Electrochim. Acta.* **1999**, 44, 3005. b) M. Benmoussa, A. Outzourhit, A. Bennouna, E. L. Ameziane, *Thin Solid Films* **2002**, 405, 11.
[2] a) J. Palenzuela, A. Viñuales, I. Odriozola, G. Cabañero, H. J. Grande, V. Ruiz, *ACS Appl. Mater. Interfaces.* **2014**, 6, 14562. b) N. Kobayashi, S. Miura, M. Nishimura, H. Urano, *Sol. Energy Mater. Sol. Cells.* **2008**, 92, 136.
[3] a) H. K. Song, E. J. Lee, S.M. Oh, *Chem. Mater.* **2005**, 17, 2232. b) A. L. Dyer, E. J. Thompson, and J. R. Reynolds, *ACS Appl. Mater. Interfaces* **2011**, 3, 1787

Keywords: pi-conjugated polymer, primary color, electrochromic display, stacked architecture



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MN-I-062

Pierre-Henri Aubert

Prof. Aubert received his PhD in 1999 at University of Franche-Comté. After several postdoc abroad – LUC (Belgium), Univ. Florida (USA), CEA Saclay (France) – he was appointed assoc. Prof. in 2005 at CY Cergy Paris University. His research interest concerns the electrochemistry of π-conjugated polymers focusing the energy storage, visible/IR electrochromic and biosensors fields. In 2017 he was promoted full Professor and develop new material as highly porous Covalent Organic Framework to cover new domains of material sciences. Actually he is co-PI of SENERGYLAB project, an International Associated Laboratory shared with Sensorlab in University of Western Cape (South Africa). He is co-author of >85 publications (IF 27), 9 patents and 5 book chapters.

MN-I-072

Synthesis and evaluation of bio-inspired catechol-functionalized poly(hydroxyethyl acrylate-co-itaconic acid)/hyaluronic acid hydrogel adhesive patches for transdermal drug delivery

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Novel hydrophilic pressure-sensitive adhesive patches made of poly(hydroxyethyl acrylate-co-itaconic acid)-catechol and hyaluronic acid were synthesized for transdermal drug delivery. The polymers were crosslinked with citric acid and aluminium hydroxide and incorporated with a pain killer, ketoprofen. The physicochemical properties, adhesive capability, molecular drug dispersion, drug content, skin permeation and coordination polymer network of the patches were evaluated. Moreover, the possibility to cause skin irritation and adhesive performance in human volunteers were investigated. The results revealed that the hydrophilic pressure-sensitive adhesive patches bearing catechol moieties exhibited superior skin adhesion ability to human skin compared with the patches without catechol moieties and a commercial patch. In addition, the patches demonstrated favorable physical and chemical stability. Therefore, catechol-functionalized poly(hydroxyethyl acrylate-co-itaconic acid)/hyaluronic acid hydrogel adhesive may be a potential material for transdermal drug delivery with excellent skin adhesive properties.

Keywords: catechol; skin adhesive; drug delivery; human medicine; pressure-sensitive adhesive

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MN-I-072

Assoc.Prof.Dr. Prasopchai Patrojanasophon

Dr. Prasopchai Patrojanasophon is currently an associate professor at the Faculty of Pharmacy, Silpakorn University, Thailand. He graduated from the Faculty of Pharmacy, Silpakorn University with a Bachelor's and Ph.D. degrees. He received funding from the Newton Fund, British Council, UK, and the RGJ Thailand to do research training at the School of Food, Chemistry, and Pharmacy, University of Reading, focusing on the synthesis of mucoadhesive nanomaterials. Dr. Prasopchai Patrojanasophon has published more than 70 papers in SCOPUS-indexed journals. His research interest is related to polymer chemistry and the synthesis of novel polymers and nanomaterials for drug delivery.

MN-I-009

Controlling 1D metal-organic nanotube (MONT) synthesis in nanomaterials

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The dimensionality of materials influences their properties and applications, which holds true for metal-organic frameworks (MOFs). While most MOFs are three-dimensional, recently, there have been significant advances toward lower dimensionality classes of these hybrid materials. One-dimensional metal-organic nanotubes (MONTs) are tunable, porous, anisotropic materials that grow from ligands and metals in solvothermal reactions similar to traditional MOFs. MONTs, like MOFs, exhibit tunable pore size and shape via judicious ligand choice, but unlike MOFs grow anisotropically, akin to carbon nanotubes. For MONTs to reach their potential as hybrid materials, their growth must be monitored so that not only is the pore size controlled, but also the particle size and their overall composition can be regulated.

Our group has previously pioneered a strategy for isoreticular synthesis of MONTs with monovalent group 11 metals, utilizing semi-rigid di-1,2,4-triazoles attached in syn conformation to the metal. The capping ligands for these MONTs are coordinating anions such as halides. This general approach has allowed for control of pore size through ligand modifications that are analogous to MOFs.

In this presentation, we showcase new di-1,2,4-triazole ligand designs for investigations into controlling MONTs' particles size and composition. Changing the nature of the intertube pi-pi stacking changes the materials that are formed and often leads to formation of MOFs or coordination polymers. Alternatively, attaching different functional groups to the ligands allows for the first example of copolymerization within a MONT.

Keywords: metal-organic frameworks; nanotubes; porous; triazoles; copper

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INVITED SPEAKER ABSTRACTS

NP

Natural Products, Biological Chemistry and Chemical Biology

NP-I-003

Towards eco-sustainable marine phytochemical cancer treatment applications

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Disease relapse and therapy resistance remain key challenges in cancer treatment. Underlying (epi-)mutational events typically promote tumorigenesis and contribute to multi-drug therapy resistance. Although innovative biomarker "omic" strategies are instrumental to optimize personalized precision oncology treatments, dynamic epigenetic plasticity of (immunogenic) cell death pathways and cellular mosaicism of the tumor-immune ecosystem frequently cause therapy escape, which prevents complete recovery and ultimately triggers disease relapse. Interestingly, ferroptosis, a novel form of iron-dependent redox and lipid peroxidation-regulated cell death was recently identified as a novel appealing treatment strategy to overcome multidrug therapy resistance in different cancer types. New ferroptosis therapeutic strategies will be presented by redox modulating phytomedicinal compounds (withaferin, mangiferin) to overcome drug resistance. More recently, we identified various bioactives from a Carribean marine plant *Thalassia testudinum*, which showed effective antitumor activity against skin and colon cancer. Since large scale industrial collection of the marine species from the coral reef-seagrass-mangrove ecosystem may damage and endanger biodiversity, eco-sustainable bioreactor based production strategies are currently developed for efficient production of secondary metabolites for novel safe and effective pharmaceutical formulations of *T. testudinum*, applicable in the prophylaxis of skin and colon cancer.

Keywords: cancer; drug resistance; ferroptosis; phytochemical; marine

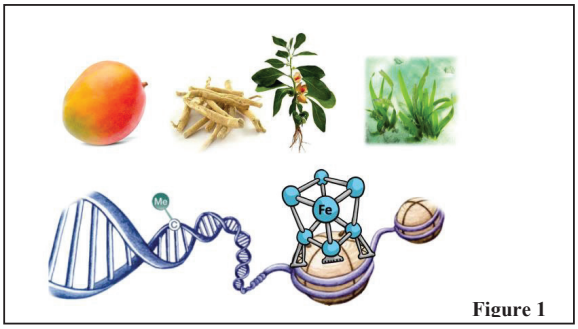

Figure 1

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NP-I-003

Wim Vanden Berghe

Prof. Wim Vanden Berghe obtained his PhD at the University of Ghent in 1999 in the Faculty of Science Biochemistry-Biotechnology. After postdoctoral research at various research institutions (University of Montpellier-France, Stellenbosch-SouthAfrica and Oxford-UK), Wim Vanden Berghe was appointed professor of Epigenetics in 2009 at the lab for Protein chemistry, proteomics and epigenetic signaling (PPES), and the integrated personalized and precision oncology network center of excellence (IPPON) (UAntwerpen, Belgium). With his current research, he is characterizing epigenetic plasticity of kinase signaling pathways to modulate aging disease phenotypes with phytomedicinal or pharmacological compounds by treating chronic inflammatory processes in cancer, atherosclerosis, obesity, diabetes or neurodegeneration.

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NP-I-009

Studies towards the mode of action of Plazomicin, a new aminoglycoside antibiotic

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Aminoglycosides are a group of antibiotics that are mainly used for the treatment of aerobic gram-negative bacterial infections. They are potent, broad spectrum antibiotic agents that mainly inhibit protein synthesis by binding to the aminoacyl site (A-site) of the 16S ribosomal RNA within the 30S ribosomal subunit, thereby leading to misreading of the genetic code and inhibition of translocation. This presentation will focus on the studies of the newest aminoglycoside antibiotic in the clinic : Plazomicin. Structural and biophysical studies to understand the interaction of Plazomicin with its target bacterial RNA will be discussed in this presentation.

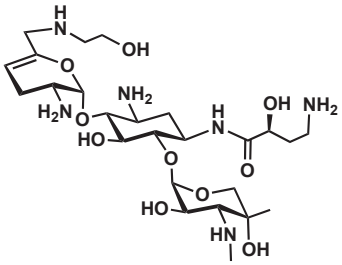
References

Structural basis for plazomicin antibiotic action and resistance; Tolou Golkar, Angelia V Bassenden, Krishnagopal Maiti, Dev P Arya, T Martin Schmeing, Albert M Berghuis, *Nature Communications biology* 4 (1), 1-8, **2021**.

Structural and phylogenetic analyses of resistance to next-generation aminoglycosides conferred by AAC (2□) enzymes; Angelia V Bassenden, Linda Dumalo, Jaeok Park, Jonathan Blanchet, Krishnagopal Maiti, Dev P Arya, Albert M Berghuis, *Nature Scientific reports* 11 (1), 1-13, **2021**.

Keywords: drug development; aminoglycosides; mechanism of action; antibacterial; RNA binding

Figure 1: Structure of Plazomicin



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NP-I-009

Dev P. Arya

Dev Arya earned his B.Sc. (chemistry honors program) from St. Stephen's College, Delhi; and Ph.D. (Bioorganic Chemistry) from Northeastern University, Boston. After spending his postdoctoral years in the labs of Prof. T. C. Bruice (UC Santa Barbara), he joined the faculty at Clemson University. Dr. Arya is a recipient of a National Science Foundation CAREER Award (2002) and the ACS Horace S. Isbell Award of the Division of Carbohydrate Chemistry (2007). He has served as the Program Chair (2004-2008), Chair-Elect (2009-2010) and Chair (2010-2011) of the ACS Division of Carbohydrate Chemistry. His laboratory focuses on development of nucleic acids (RNA) targeted drug development.

NP-I-023

Discovery of novel bioactive secondary metabolites from hypoxylaceous fungi using polythetic taxonomy, phylogenomics and metabolomics

Marc Stadler[1,2,*]

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The Hypoxylaceae are one of the largest families of Xylariales (Ascomycota) and have been a main subject of our polyphasic taxonomic studies and bioprospecting approaches over the past decade. Several hundreds of strains have been isolated from ascomata collected in the field, subjected to fermentation, and the cultures were extracted with organic solvents. The secondary metabolites were purified by preparative HPLC from the extracts or directly from the ascomata, and their structures were elucidated by spectral methods (NMR, HR-MS). The strains were studied for morphological and chemotaxonomic features, and their DNA sequence data were used to set up a multi locus phylogeny. Recently, high quality genome sequences were obtained from a selection of representative species using 3rd generation (PacBio/Oxford nanopore) technology. Over 100 novel secondary metabolites were discovered, some of which constitute novel carbon skeletons. All compounds were subjected to a biological characterization including antimicrobial, cytotoxic and other bioactivities. The biosynthesis of selected compound classes is now being studied, and their production in heterologous hosts including mutasynthesis has been successfully conducted. This strategy led once again to several novel molecules. In parallel, the first phylogenomic study using representatives of the major phylogenetic clades of the Hypoxylaceae was carried out based on the HQ genome data, revealing interesting correlations between the genotypes and phenotypes. The most important, recent findings of this project will be discussed.

Literature: Becker K, Stadler M (2012) J Antibiotics 74:1-23; Kuhnert E. et al. (2021) Stud Mycol 99:100118; Wibberg D et al. (2021) Fungal Divers. .

Keywords: Secondary metabolites; biodiversity; ascomycetes

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NP-I-023

Marc Stadler, Prof. Dr. rer nat.

Marc Stadler obtained his PhD in Biology/Biotechnology at Kaiserslautern University/Germany, in 1993. After a postdoc stay at Lund University/Sweden (Organic chemistry department; 1994-1995), he joined Bayer Pharma and worked there until 2006. Then he co-founded InterMed Discovery GmbH (Dortmund) and worked there as Director of Fermentation /Microbiology. In parallel, he obtained the venia legend in Mycology at Bayreuth University, Germany. Since 2012 he has been leading the Department "Microbial Drugs" at HZI Braunschweig, Germany, co-appointed by Technical University of Braunschweig as Full Professor. In 2013, he was appointed Visiting Professor by CAS State Key Lab of Mycology, Beijing. He is serving in the Editorial Boards of several journals and as President-elect of the International Mycological Association (IMA). His major research interests are fungal taxonomy and phylogeny, discovery of bioactive metabolites and biotechnological process development. He has co-published over 400 papers and patent applications on these topics.

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NP-I-079

Natural Products for Drug Discovery in the Era of Personalized Medicine

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Personalized Medicine is an upcoming practice in medicine that is based on individual genetics, biomarkers and clinical data and with the use of targeted therapy. More than one third of recently approved drugs are personalized medicine, drugs prescribed with companion biomarkers. In addition, genetic manipulation of patient's cells (e.g. Chimeric antigen receptor T cells or CAR T cells) are currently used for cancer treatment in a personalized manner, which is inaccessible to patients due to its high cost. With the advancement of systems biomedicine analyzing human samples and humanized models, personalized drug targets are increasingly discovered especially for genetic diseases and cancer. Natural products represent an enormously valuable source of chemical compounds for development of chemical drugs, which has advantages including its accessibility, less production complexity and possibility to use in oral forms. Systems-based analysis and target deconvolution of natural products as well as personalized human-derived experimental models are very helpful in predicting potential utility of natural products as personalized medicine. In addition, variation in response due to genetic and behavioral variations should be considered. Examples of studies using humanized models for natural product-based drug discovery will be presented.

Keywords: Personalized Medicine; Drug Discovery; Cancer; Diarrhea; Natural Products

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NP-I-079

Chatchai Muanprasat

Professor Chatchai Muanprasat, M.D., Ph.D. has research interest in drug discovery based on natural products and small molecules. He received several awards including Young Scientist Award, TRF-OHEC-Scopus Researcher Award, Mahidol University for Excellence in Teaching and Outstanding Young Physiologist Awards. Currently, he serves as a Coordinator of BCG Frontier Research Cluster, Program Management Unit for Human Resources & Institutional Development, Research and Innovation (PMU-B), Thailand.

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INVITED SPEAKER ABSTRACTS

OM

Organic Synthesis and Medicinal Chemistry

OM-I-007

Design and syntheses of new antiviral agents with broad-spectrum

Reuben J.-R. Hwu[1,2], S.-C. Tsay[1], A. Roy[1], N. K. Gupta[1], M. Kapoor[1], W.-C. Huang[1], P. Lyssen[3], and J. Neyts[3]
[1]*Department of Chemistry, National Tsing Hua University, Hsinchu 30013, Taiwan*
[2]*Department of Chemistry, National Central University, Jhongli City, 32001, Taiwan*
[3]*Rega Institute for Medical Research, Katholieke Universiteit, Leuven, B-3000, Belgium*
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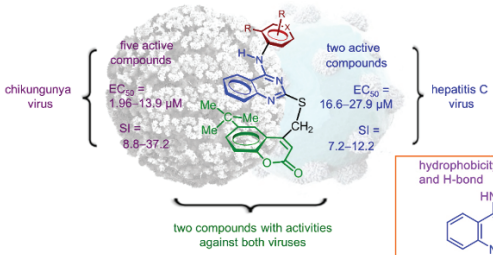
New antiviral drugs with broad-spectrum are urgently needed to cure RNA virus diseases, for which no vaccines or drugs are available nowadays. Successful development of new quinazolin-4-amine-SCH2-coumarin conjugates as drug leads with broad spectrum against CHIKV and HCV [1] is discussed first in this speech. Among many new conjugated compounds synthesized, two conjugates exhibit compelling inhibitory activities towards both CHIKV and HCV. Consequently, new drug leads in the form of conjugated scaffold with broad-spectrum are feasible.

Meanwhile, molecular docking simulation studies are performed to discover an ideal structure fitted into the nsP3 macro domain of CHIKV [2]. The skeleton of quinazoline ⁑ coumarin arylsulfonates has three nuclei and a sulfonate joint. It is analogous to the ADP–ribose, which also has three nuclei and a pyrophosphate joint. Our computational outcomes provide the aid on rational design of conjugates to inhibit CHIKV in Vero cells and is discussed in the second part of this speech.



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OM-I-007

Reuben Jih-Ru Hwu,

Reuben Jih-Ru Hwu, Stanford Uni., Ph.D. (1982); Asst./Associate Prof. (1982–90), Johns Hopkins Univ.; Distinguished Chair Professor (2015–), National Tsing Hua Univ.; Dean (2007–2010), National Central Univ.; Fellow of The World Academy of Sciences (1999–); Fellow of IUPAC (2000–); Fellow of The Royal Society of Chemistry (2005–); Member of the European Academy of Sciences and Arts (2019–); and president of Federation of Asian Chemical Societies (2019–2023).

References

[1] Hwu, J. R.; Kapoor, M.; Gupta, N. K.; Tsay, S.-C.; Huang, W.-C.; Tan, K.-T.; Hu, Y.-C.; Lyssen, P.; Neyts, *J. Eur. J. Med. Che*m. **2022**, 232, 114–164.

[2] Hwu, J. R.; Roy, A.; Tsay, S.-C.; Huang, W.-C.; Lin, C.-C.; Hwang, K. C.; Hu, Y.-C.; Shieh, F.-K.; Lyssen, P.; Neyts, J. *Int. J. Mol. Sc*i. **2022**, 23, 7646.

OM-I-049

Green and Biocompatible Reactions: From Discovery to Applications

Teck-Peng Loh*
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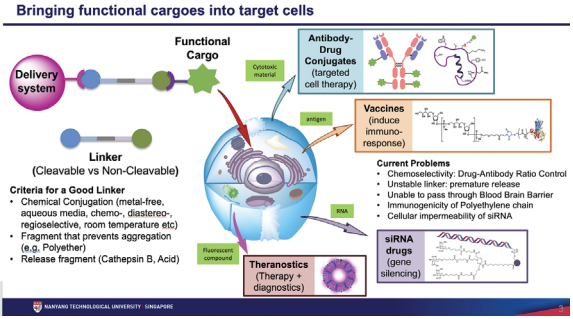
The field of organic synthesis has experienced significant progress towards achieve the goal of more efficient and sustainable processes. Green Chemistry has also become an important theme for the chemists to address the environmental problems. In my talk, I'll introduce our lab's efforts during last 25 years in the field of green chemistry: from the discovery to applications.

Keywords: Organic synthesis; Green Chemistry; Sustainable processes;



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OM-I-049

Teck-Peng Loh

Prof. Teck-Peng Loh obtained his Ph.D from Harvard University and hold his current Professor position since February 2005 in Nanyang Technological University. Prof. Loh's selected awards include: President's Science Award 2018, Yoshida Prize 2017, Research & Innovation Award (Individual) 2007. He is fellow of Academy of Sciences Malaysia, fellow of Academy of Sciences Singapore. His research interests include green chemistry, the development of new synthetic methodology, and total synthesis *etc*..

OM-I-051

Copper makes the difference: Developing Sustainable Photoredox Catalyzed Transformations

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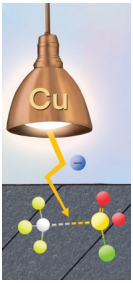

Synthetic organic chemistry undertakes great efforts to develop new catalytic transformations that utilize greener reagents and avoid stoichiometric additives. In this regard, visible-light photoredox catalysis offers a unique activation mode of molecules, which is serving as an alternative to many thermal transition-metals catalyzed reactions. The vast majority of photoredox-catalyzed processes capitalizes on heavy metals namely, Ru(II) or Ir(III)-complexes which can serve as single electron oxidant or reductant in their photoexcited states. As a low cost-alternative, organic dyes are also frequently used photocatalysts but suffer in general from lower photostability. Copper-based photocatalysts are rapidly emerging, offering not only economic and ecologic advantages, but in addition are able to interact with substrates beyond electron transfer via inner sphere mechanisms, which has been successfully utilized to achieve challenging transformations.
Selected synthetic applications from our laboratory, highlighting the complementary opportunities of copper and iridium-based photocatalysts, will be discussed.

Leading references: N. Katty, Q-Q. Zhao, T. Mandal, O. Reiser, *ACS Catal.* **2022**, *12*, 14398; A. Reichle, H. Sterzel, P. Kreitmeier, R. Fayad, F. N Castellano, J. Rehbein, O. Reiser, *Chem. Commun.* **2022**, *58*, 4456; A. Chinchole, M. A. Henriquez, D. Cortes-Arriagada, A. R. Cabrera, O. Reiser, *ACS Catal.* **2022**, *12*, 13549; M. Kumar, S. Verma, V. Mishra, O. Reiser, A.K. Verma, *J. Org. Chem.* **2022**, *87*, 6262; Q-Q. Zhao, J. Rehbein, O. Reiser, *Green Chem.* **2022**, *24*, 2772.

Keywords: copper; photoredox catalysis; ATRA reactions; light-induced homolysis; renewable resources

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OM-I-051

Oliver Reiser

Oliver Reiser studied chemistry at the Universities of Hamburg, Jerusalem, and Los Angeles (UCLA) and obtained his Ph.D. in 1989 with Prof. Dr. Armin de Meijere. He spent 2.5 years as a postdoctoral fellow with Dr. R. Miller, IBM Research Center, San Jose, USA, and with Prof. Dr. D. A. Evans, Harvard University, Cambridge, USA. In 1992 he moved to the University of Göttingen as an Assistant Professor, and in 1996 he moved to the University of Stuttgart as an Associate Professor. Since 1997 he has been a Professor of Organic Chemistry at the University of Regensburg, having served as Vice President and currently as Dean responsible for Research. His group's research interests are focused on the development of sustainable methodology for the conversion of renewable resources towards value-added compounds.

OM-I-052

Total synthesis of palodesangrens and lamellarins/azalamellarins

Poramate Songthammawat[1], Kanawut Klumthong[1], Kassrin Tangdenpaisal[1], Somsak Ruchirawat[1,2], Poonsakdi Ploypradith[1,2]*

[1]*Laboratory of Medicinal Chemistry, Chulabhorn Research Institute, 54 Kamphaeng Phet 6 Road, Bangkok, Thailand 10210*

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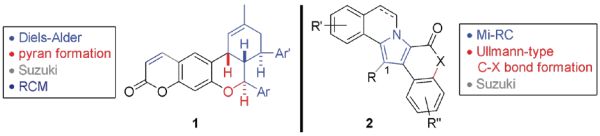
Total synthesis of natural products has played a key role in advancing the frontiers in organic synthesis as it highlights the importance of developing new synthetic methods and executing newly devised synthetic strategies. Over the years, our research group has focused on the total synthesis of palogesangrens, a group of secondary plant-derived metabolites featuring a tetracyclic core of tetrahydro-4*H*,9*H*-benzo[*c*]pyrano[3,2-*g*]chromen-9-one (**1**) with 4 contiguous stereogenic centers. On the other hand, lamellarins and their lactam analogs, a group of secondary marine-derived metabolites featuring a pentacyclic core of 6*H*-chromeno[4',3':4,5]pyrrolo[2,1-*a*]isoquinolin-6-one (**2**) with a non-fused substituent at C1, have also been the targets of designing a novel modular synthesis to provide them in sufficient quantities for further biological studies. Applications of various synthetic methods featuring Diels-Alder cyclohexene formation, Michael addition/ring closure (Mi-RC) pyrrole formation, ring-closing metathesis (RCM), and transition-metal catalyzed cross-coupling reactions to forge both requisite skeletons with the desired stereo- as well as regio-selectivity will be discussed.

Keywords: total synthesis; palodesangren; lamellarin; stereoselectivity; regioselectivity



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OM-I-052

Poonsakdi Ploypradith

Poonsakdi Ploypradith received his education (B.A., M.A., and Ph.D. (with the late Professor Gary H. Posner)) from the Johns Hopkins University. Since 2000, he has been research scientist at Laboratory of Medicinal Chemistry, Chulabhorn Research Institute where he has been promoted through levels equivalent to academic ranks (research scientist I (assistant professorship) in 2009, research scientist II (associate professorship) in 2015, and expert scientist (professorship) in 2022). He has also been jointly appointed as a lecturer in the Program in Chemical Sciences, Chulabhorn Graduate Institute since 2007. His research interests encompass development of novel and efficient synthetic methods, total synthesis of natural products, and medicinal chemistry of bioactive compounds.

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OM-I-040

Syntheses of complex securinega alkaloids

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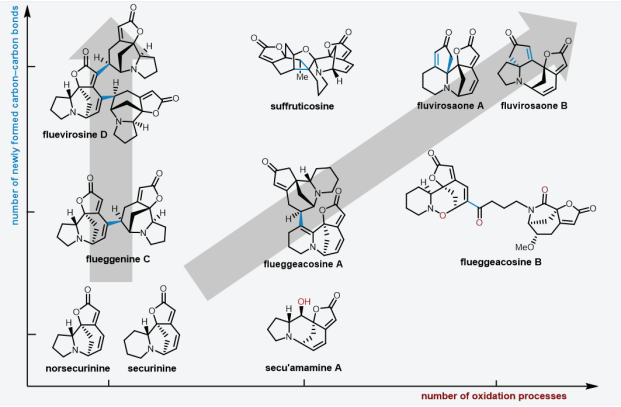
Securinega alkaloids have fascinated the chemical community for over six decades. Among these secondary metabolites, there are members that are biosynthesized via oligomerization(s) and oxidation(s) of the basic tetracyclic core of securinega monomers. Despite the rich history of the synthesis of basic monomeric securinega alkaloids, syntheses of oligomeric securinega alkaloids as well as oxidized derivatives had remained relatively unexplored due to the lack of chemical technologies to tackle those extra complex congeners. In this presentation, our group's recent discoveries centered on the chemical synthesis of high-order and high-oxidation state securinega alkaloids will be discussed. Total synthesis of flueggenines C,[1] D,[2] secu'amamine A, fluvirosaones A and B,[3] collective total synthesis of C4-oxygenated securinine-type alkaloids,[4] and concise synthesis of dimeric securinega alkaloid flueggeacosine B[5] will be discussed.



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INVITED SPEAKER ABSTRACTS

PC

Polymer Chemistry and Bio-based materials

PC-I-036

The struggles of natural rubber as an eco-friendly industrial polymer

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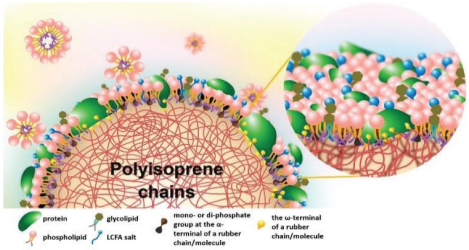
Department of Chemistry and Center of Excellence for Innovation in Chemistry, Faculty of Science, Mahidol University, Nakhon Pathom 73170, Thailand.
**E-mail. jitladda.sak@mahidol.ac.th*

Natural rubber (NR) and synthetic polyisoprene (IR) are highly stereo-regular structures mainly composed of *cis*-1,4 polyisoprene, while IR also has *trans*-1,4 and 3,4-isomers. Only NR contains non-rubber components (NRCs) such as phospholipids, protein, carbohydrates, inorganic salts, *etc*., while IR lacks. The NRCs in NR, especially proteins and phospholipids, and geometrical isomers, are responsible for the superior properties of NR over IR. Using NR products is often associated with NR allergy, leading to non-immunologic and immunologic allergic reactions in sensitive people. The structure and properties of NR regarding NR allergy, as well as the feasibility of optimizing type I-rubber allergens in NR latex and dipping products, will be discussed, along with surface profiles, film formation, mechanical testing, and property analyses. Lastly, the NRCs can also produce color and odor, limiting some NR applications, especially for light-colored NR products in high demand. Eliminating NRCs from NR can reduce its yellow color and odor. Our research strengthens customer confidence in Thai natural rubber over synthetic rubber by establishing a quality standard, boosting NR consumption to compete in various rubber application industries, and offering struggles for NR as a sustainable industrial polymer.

Keywords: natural rubber; non-rubber components; protein allergy; yellowness; odor



Schematic representation of scenarios of rubber particles

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PC-I-036

Professor Jitladda Sakdapipanich

Professor Sakdapipanich was awarded the Monbusho scholarship for her Master's and Ph.D. studies at the Tokyo University of Agriculture and Technology. In 1996, she was appointed as a lecturer in the Department of Chemistry in the Faculty of Science at MAHIDOL University. In 2011, she was placed in charge of a polymer science professor. She is extremely enthusiastic about structural characterization and the creation of new materials. Also, she has developed a novel technique for lowering natural rubber, which is particularly useful for high-risk allergenic usage. Her interests also include novel chemical modifications of natural rubber. The growth of skim NR and L-quebrachitol was attractive, derived from NR latex industrial waste. This skim rubber has many applications, including pressure-sensitive adhesive tape, particularly for medical applications, and chewing gum - the first technology in the world to apply NR to a food-grade product.

PC-I-037

Therapeutic Agents using Biopolymers

Lisbeth Grøndahl
School of Chemistry & Molecular Biosciences, The University of Queensland, Brisbane, Australia
Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbane, Australia
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The use of delivery systems to deliver therapeutic agents is a strategy used to enhance drug stability, reduce side effects, and target specific sites. The applications are vast and cover cancer therapy, tissue regeneration, and vaccines. Depending on the application different administration routes are required which put restrictions on the type of delivery system that can be used. The work presented will illustrate design parameters for delivery of a range of active agents for different applications. Biopolymer-based materials are the focus of the work encompassing polysaccharide, peptide and polyester based systems. Finally, the work will highlight challenges and pitfalls in characterisation of the delivery systems; the effect of release media; and method of evaluating release of therapeutic agents.

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PC-I-037

Professor Lisbeth Grøndahl

Professor Grøndahl has a PhD in chemistry from the University of Copenhagen. She works in the interdisciplinary field of biomaterials science with a focus on development of approaches to create functional polymeric biomaterials in the form of membranes, scaffolds, hydrogels and nanoparticles. Her core research expertise includes surface modification of polymers and inorganic particles, controlled assembly of biopolymers and nanocomposites, as well as comprehensive characterization of surfaces, composites and biopolymer assemblies. She is a Fellow of Biomaterials Science and Engineering (FBSE) and was in 2018 selected by the journal Biointerphases as one of 15 Women in Biointerface Science Professor.

PC-I-038

Responsive polymer conjugates for anticorrosion applications

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Vidyasirimedhi Institute of Science and Technology
Department of Materials Science and Engineering, Rayong, Thailand
**E-mail: daniel.crespy@vistec.ac.th*

In the last two decades, smart coatings for anticorrosion have been designed by embedding responsive fillers releasing corrosion inhibitors and healing agents in inorganic or organic matrixes. In a novel approach, we designed polymer coatings by conjugating corrosion inhibitors to polymers via responsive cleavable linkages.[1] The inhibitors were then released from the polymer coatings upon change of local pH value near the metal substrate or change of redox potential occurring during the corrosion process. In particular we investigated the influence of steric hindrance and torsional energy on the hydrolysis of thiopropionates by preparing conjugates with various substituents.[2]

Furthermore, antibifouling properties could be imparted to these polymer-inhibitor conjugates by copolymerizing functional monomers with fluorinated monomers.[3] Coatings produced with the obtained copolymers significantly reduced the corrosion rate of steel substrates compared with conventional coatings and also impaired the attachment and growth of algae on their surfaces.

Finally, we synthesized polymer nanoparticles displaying a pH-dependent FRET process. The nanoparticles embedded in an epoxy coating on metal could be used as sensors for monitoring the local pH in the coatings.[4] Rapid pH-mapping of the coatings via a smartphone allowed an early detection of corrosion, hence signalling the need for an operation of maintenance before critical damage to the metal occurred.

References

[1] F. Seidi, R. Jenjob, D. Crespy, *Chem. Rev.* **2018**, *118*, 3965
[2] N. Kongkatigumjorn, P. Srikamut, F. Seidi, S. Bureekaew, D. Crespy, *Chem. Mater.* **2022**, *34*, 2842
[3] T. Yimyai, R. Thiramanas, T. Phakkeeree, S. Iamsaard, D. Crespy, *Adv. Funct. Mater.* **2021**, *31*, 2102568
[4] M. Theerasilp, D. Crespy, *Nano Lett.* **2021**, *21*, 3604

Keywords: anticorrosion; coatings; controlled release; nanosensors; stimuli-responsive polymers

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PC-I-038

Associate Professor Daniel Crespy

Associate Professor Crespy studied chemistry at the University of Strasbourg and completed his PhD under the supervision of Professor Katharina Landfester at the University of Ulm (Germany). In 2006, he became a project leader at Empa (Swiss Federal laboratories for Materials Research and Technology). He joined the department of Professor K. Landfester at the Max Planck Institute for Polymer Research (Mainz, Germany) in July 2009 as group leader. Daniel Crespy is since 2016 an Associate Professor in the Vidyasirimedhi Institute of Science and Technology in Rayong, Thailand. His current work is focused on responsive polymer materials for biomedicine, self-healing, and anticorrosion applications.

PC-I-055

Polymers and the eye - challenges and opportunities

Brian Tighe
Chemical Engineering and Applied Chemistry, Aston University, B4 7ET, UK
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Biomaterials science is producing increasingly sophisticated and successful approaches to the use of synthetic materials in bodily repair and regeneration and the eye holds a special place in this area of work. This stems from its ready accessibility, coupled with the work initiated over fifty years ago by Otto Wichterle, which identified hydrogels, notably poly(2-hydroxyethyl methacrylate) – usually abbreviated to HEMA – as key materials in his invention of soft contact lenses. This marked the beginning of the more general exploitation of hydrogels in the biomaterials field and any success is largely due to their unique hydration and lubrication characteristics, which to some extent mimic those of natural tissue.

The effects and consequences of the worldwide COVID-19 pandemic have thrown the questions of hydration and lubrication into new focus because of the interaction of the virus with mucosal surfaces, including the lung, mouth and eye. This talk will attempt to link this particular problem with the growing interest in the use of biomimetic techniques in the development of new biomaterials and the desire for increased use of sustainable biological sources in new materials development.

Keywords: ocular environment; hydrogels; biomaterials; tear film; biomimesis

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PC-I-055

Professor Brian Tighe

Following a seven-year period in the UK polymer industry, Professor Tighe moved to an academic career at Aston University in Birmingham working on the design of polymers for specific applications. At Aston, he formed the Aston Biomaterials Research Unit (ABRU) where he has published over 500 papers and personally supervised over 100 PhD students. ABRU is one of the few academic centers in the world with expertise in the design, synthesis and characterisation of hydrogel-based biomaterials with parallel activity in the study of their interaction with biological systems. Professor Tighe continues to have active collaborations with many institutions around the world. He is internationally recognized for his contributions to the study of hydrogel-based biomaterials for which he has received a number of awards including the European Federation of Contact & Intraocular Lens Manufacturers Technology Award (2008), the Reuben Research Medal (2009) from the International Society of Contact Lens Research, Spine Technologies of the Year Award (2009), the Owen Aves Medal (2012), the Fellowship College of Optometrists (2014) and, most recently, the Most Excellent Order of the British Empire (OBE) in the Queen's Birthday Honours List (2015) for "Services to research in biomedical polymers".

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PC-I-060

Case studies in polymer innovation: stimuli responsive soft matter, high performance 3D printable materials and waste plastics initiatives

Xiao 'Matthew' Hu, [1, 2, 3]
[1]*School of Materials Science and Engineering,* [2]*RGE-NTU, Sustainable Textile Research Centre (SusTex),*
[3]*Sustainable Chemistry and Materials, Nanyang Environment and Water Research Institute, Nanyang Technological University*
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This paper discusses some of our recent work on functional soft matters and new development of 3D printable high-performance polymers. First, the design rationale, synthetic approaches and potential applications of stimuli responsive polymers are discussed. Representatively examples will be given for three classes of hydrogels, i.e., thermally responsive semi-IPN hydrogels, surface functionalized gradient hydrogels and dendritic DNA hydrogels. Furthermore, discussion will be carried out on innovative design and synthesis of low viscosity, photo/thermal dual curable and 3D printable polybenzoxazine resins. Other new 3D printable materials to be discussed include precision 3D printable polymer-derived carbon and even 3D printable polymer-derived ceramics. Finally, if time permits, an introduction will be given on some of the initiatives taken in NTU to tackle waste plastic challenges. This includes the most recent work of ionogels derived from ionic liquid catalyzed depolymerization of waste plastics.
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Keywords: Stimuli responsive hydrogels; ionogels; projection micro-stereolithography; novel 3D printable high-performance polymers; plastic waste challenge

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PC-I-060

Professor Xiao (Matthew) Hu

Professor Xiao Hu gained PhD from University of Manchester in 1990 and joined Nanyang Technological University (NTU) in April 1992 as one of the founding members of its Materials Engineering program. He is the Director of the Environmental Chemistry and Materials Centre (ECMC) at the Nanyang Environment and Water Research Institute (NEWRI), and the Co-Director of the newly established RGE-NTU Sustainable Textile Research Centre. His research interests include functional polymers, nano-hybrids and nanocomposites. His group works on design, synthesis and processing of new materials for targeted applications including working towards circularity and sustainability in polymer systems. Professor Hu has so far contributed to about 400 international journal papers and more than 120 conference presentations including a number of invited, keynote and plenary speeches. He also has more than 25 IP inventions some of which have or is being commercialized. Professor Hu served as the immediate past President of the Pacific Polymer Federation (PPF).

INVITED SPEAKER ABSTRACTS

PT

Physical and Theoretical Chemistry

PT-I-001

Can we understand CO_2 electroreduction selectivity from electronic structure?

Kaito Takahashi[1*], Supawadee Namuangruk[2]
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[2] *National Nanotechnology Center, National Science and Technology Development Agency, Thailand*
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Obtaining efficient catalysts for electrocatalytic CO_2 reduction has been an active field of study these past few decades. About a decade ago, the concept of a single-atom catalyst (SAC) was experimentally realized where a single active transition metal (TM) atom was embedded in a substrate or alloyed with other metal surfaces.
We investigated the CRR activity of 3d-TM doping on the ZnO (0001) monolayer (TM =Sc, Ti, V, Cr, Mn, Fe, Co, Ni, and Cu) using denstiy functional theory. We found that while pristine ZnO monolayer requires a high limiting potential of -1.2V to produce HCOOH. Remarkably, Co@ZnO can produce HCOOH with ultra-low overpotential at 0.02 V. From the systematic evaluation of all the 3d-TM, we found the oxidation state of TMs from different d-orbital occupancy results in a change of the electronic properties of the catalysts, leading to a difference in reactivity, reaction pathway, and selectivity of the final products. *Early TMs* (Sc to Cr) showing oxidation state +3 prefer CH_4 as a product, while late TMs (Mn to Cu) show oxidation state +2, which favorably produce HCOOH. Furthermore, we rationalized the change in oxidation state occurring at Mn by considering the planar trigonal ligand field generated by the oxygen atom surrounding the doped TM the ZnO support. If Mn took the +3 oxidation state similar to Cr, it would have one empty orbital at the degenerate d_{xy} and $d_{x^2-y^2}$ combinations, thus it takes the +2 occupation resulting in a $3d^5$ configuration.

Keywords: quantum chemistry; oxidation state; activation energy; charge analysis; keyword 5

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PT-I-001

Kaito Takahashi

Kaito Takahashi is a Japanese theoretical chemist working as an associate research fellow in the Institute of Atomic and Molecular Sciences, Academia Sinica, Taiwan. He obtained his Ph.D. from Keio University under the tutelage of Prof. Satoshi Yabushita in 2005. His scientific interests for the past few years have been to theoretically understand properties that control reactions and to simulate experimental observables such as rate coefficients, IR, Raman, UV and X-ray spectra. In 2017 he received the QSCP Promising Scientist Prize of (Centre de Mécanique Ondulatoire Appliquée.

PT-I-002

Theoretical analysis on 3D domain-swapped artificial proteins

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Various factors, such as helical propensity and hydrogen bonds, control protein structures. We have previously shown that a frequently used model protein, myoglobin (Mb), can form a 3-dimensional domain-swapped (3D-DS) dimer, and we succeeded in obtaining monomer–dimer equilibrium in the native state by introducing a high α-helical propensity residue, Ala, to the hinge region. Here, we focused on another factor that governs the protein structure, hydrogen bonding. X–ray crystal structures and thermodynamic studies showed that the Mb dimer is stabilized over the monomer when the H-bond network at the hinge region of the dimer is enhanced by keeping His82 to interact with Lys79 and Asp141 and mutating Leu137, which is located close to the hydrogen bonding network, to hydrophilic amino acids.

Molecular dynamics (MD) simulations of wild-type 3D-DS dimers also confirmed that the number of H-bonds increased for mutants with a tighter H-bond network as shown in middle panel of Fig. 1. The simulation also showed that the distance between the helices at the hinge region becomes shorter as the H-bond network is enhanced, supporting the hypothesis that the helices at the hinge region become tighter and the Mb dimer is stabilized when the H-bond network at the hinge region is enhanced. This reveals the importance and utility of hydrogen bonds for designing a protein dimer from its monomer. We analyze the 3D-DS tetramer of light chain of antibody by means of MD simulations. We confirm that the 3D-DS dimer has two different conformations, and the structral stability of them to understand why it forms the tetramer.

Keywords: MD simulation; 3-dimensional domain-swapped proteins; Structural stability; Thermal stability; Myoglobin; Antibody

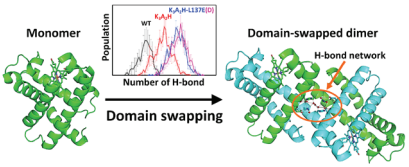

Figure 1 Two Mb monomers can form a domain-swapped dimer by denaturation. Upon introduction of amino acid residues which can form hydrogen bonds (h-bond) between hinge regions of each monomer, thermal stability of mutant Mb domain-swapped dimer increases owing to the h-bond confirmed by MD simulation.

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PT-I-002

Yasuteru Shigeta

Prof. Yasuteru Shigeta, a Theoretical Chemist, graduated from Department of Chemistry, Osaka University and obtained PhD in 2000. He pursued his postdoctoral research at Osaka University, Kansas State University, and the University of Tokyo. He worked at the University of Tokyo during 2004-2007(Assistant professor), University of Tsukuba during 2007-2008 (lecturer), University of Hyogo during 2008-2010 (Associate professor), Osaka University during 2010-2014 (Associate professor), and now joined University of Tsukuba as a full professor since 2014. He has published more than 270 scientific papers and received the PCCP award of Royal Society of Chemistry (UK) in 2007, Young-chemists award of the Chemical Society of Japan in 2009, the Young-scientists award of Ministry of Education, Culture, Sports, Science, and Technology (MEXT) Japan in 2010, the Young-scientists award of Japan Society for Molecular Science in 2012, and the QSCP Promising Scientist Prize of CMOA in 2017.

PT-I-004

Photochemical Kinetic: Delayed Fluorescence, Up-Conversion, Triplet-Triplet Annihilation and Energy Transfer

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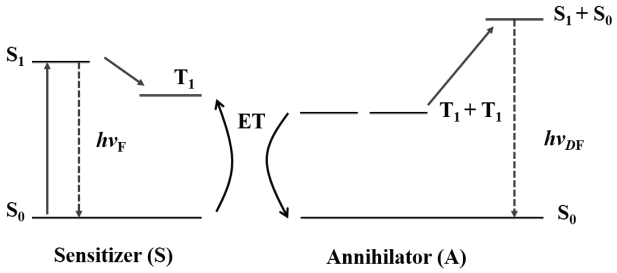
Since the late 70s, delayed fluorescence (DF) is a well-known phenomenon in photochemistry [1]. It is also called as **up-conversion, triplet-triplet annihilation** and is a promising reaction mechanism to store energy used in photovoltaic cells, etc. It has been proved that an **external magnetic field** has an influence on the delayed fluorescence yield. This paper intends to explore the influence of an external magnetic field on the processes leading to delayed fluorescence in solution. We used an energy-transfer sensitized fluorescence reaction to study the MFE of a P-type delayed fluorescence system. A magnetic field can influence the triplet-triplet annihilation reaction: $T_1(A) + T_1(A) \quad {}^{1,3,5}[T_1T_1](A)$ as it splits the energy levels of the triplet pairs, which can either be in singlet, triplet or quintet state. Whereas at zero field all spin states are available, the number of attainable states differ with an external magnetic field present. A sensitized system consisting of zinc-tetraphenyl porphyrine (ZnTPP) as a sensitizer (S) and perylene as annihilator (A) is used, resulting in a higher delayed fluorescence intensity and avoiding the strong emission of the prompt fluorescence. We report on simultaneous time-resolved laser spectroscopic measurements of both, the delayed fluorescence and the instantaneous fluorescence of the sensitizer.

Keywords: Delayed Fluorescence, Up-Conversion, Triplet-Triplet annihilation.



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PT-I-004

Guenter Grampp

Emeritus Prof. Dr. Guenter Grampp gained his Ph.D. in Physical Chemistry from the University of Erlangen, Germany in 1981. He obtained the Habilitation in Physical Chemistry at Erlangen in 1989. He moved to the Technical University of Graz, Austria, where he was full professor and Head of the Institute of Physical and Theoretical Chemistry in 1994. He retired in 2018 and currently serves as professor emeritus. Grampp's research focuses on electrochemistry of short living triplet states and radicals in solution, electron- and proton transfer reactions, ESR-Spectroscopy, time-resolved laser spectroscopy, fluorescence spectroscopy, and magnetic field effects in chemistry. He has received awards such as Distinction Award from the Republic of Hungary for Bilateral Research Co-operation, Premium Pannonia Award of the University of Veszprem/Hungary for Outstanding Research Cooperation, and Medal "100th Anniversary of Acad. N.M.Emanuel", Russian Academy of Science and Lumonosov University, Moscow, for outstanding Achievements in Chemical and Biochemical Physics.

PT-I-005

Bipolar electrochemistry: the renaissance of a physico-chemical concept

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Bipolar electrochemistry is a concept based on the fact that two opposite chemical processes, oxidation and reduction, occur simultaneously on the surface of a (semi)conducting object, without connection to a power supply[1]. We distinguish between exogenous bipolar systems, for which the primary driving force originates from an external electric field, and endogenous bipolar objects, where an asymmetric chemical composition provides the necessary thermodynamic power to induce spatially separated reactions. The basic phenomena have already been described and used for a long time, but regained interest in recent years, because it became apparent that bipolar electrochemistry has attractive features for developing new applications in various areas. This is mostly due to several advantages over classic electrochemistry, such as the absence of an ohmic contact, the generation of a dual gradient of electroactivity on the same object and the possibility to address simultaneously thousands of objects. Also, some features of this type of electrochemistry allow performing experiments which simply cannot be done with a classic electrochemical set-up.
The objective of this presentation is to introduce first the basic aspects of bipolar electrochemistry, and then to illustrate some very recent applications of this concept studied in our group, ranging from materials science[2,3] and (bio)electroanalysis[4-9], to the generation of motion[10-15] and electrosynthesis[16-18].

Keywords: Bipolar electrochemistry; Catalysis; Analysis; Actuators; Microswimmers

References

[1] Bipolar electrochemistry, L. Bouffier, D. Zigah, N. Sojic, A. Kuhn, *Encyclopedia of Electrochemistry*, Bard et al. (Eds.), Wiley, 2021.
[2] A.A. Melvin, E. Lebraud, P. Garrigue, A. Kuhn, **PCCP** 22 (2020) 22180
[3] S.M. Beladi-Mousavi, G. Salinas, N. Antonatos, V. Mazanek, P. Garrigue, Z. Sofer,A. Kuhn, **Carbon** 191 (2022) 439
[4] L. Zhang, B. Gupta, B. Goudeau, N. Mano, A. Kuhn, **J. Am.Chem.Soc**. 140 (2018) 15501
[5] S. Assavapanumat, B. Gupta, G. Salinas, B. Goudeau, C. Wattanakit, and A. Kuhn, **Chem. Comm**. 55 (2019) 10956
[6] S. Arnaboldi, B. Gupta, T. Benincori, G. Bonetti, R. Cirilli, A. Kuhn, **Anal.Chem**. 92 (2020) 10042
[7] S. Arnaboldi, G. Salinas, A. Karajic, P. Garrigue T. Benincori, G. Bonetti, R. Cirilli, S. Bichon, S. Gounel, N. Mano, A. Kuhn, **Nature Chem.** 13 (2021) 1241
[8] S. Arnaboldi, G. Salinas, G. Bonetti, R. Cirilli, T. Benincori, A. Kuhn, **Biosens.&Bioelectron**. 218C (2022) 114740
[9] G. Salinas, S.M. Beladi-Mousavi, L. Gerasimova, L. Bouffier, A. Kuhn, **Anal. Chem**. 94 (2022) 14317
[10] B. Gupta, L. Zhang, A.A. Melvin, B. Goudeau, L. Bouffier, A. Kuhn, **Chem. Sci.** 12 (2021) 2071
[11] A. A. Melvin, B. Gupta, K. Tieriekhov, P. Garrigue, S. Reculusa, A. Kuhn, **Adv. Funct. Mater.** 31 (2021) 2101171
[12] G. Salinas, A. L. Dauphin, C. Colin, E. Villani, S. Arbault, L. Bouffier, A. Kuhn, **Angew. Chem. Int. Ed.** 59 (2020) 7508
[13] G. Salinas, A. L. Dauphin, S. Voci, L. Bouffier, N. Sojic, A. Kuhn, **Chem. Sci.** 11 (2020) 7438
[14] I.-A. Pavel, G. Salinas, A. Perro, A. Kuhn, **Adv. Intell. Syst.** 3 (2021) 2000217
[15] G. Salinas, K. Tieriekhov, P. Garrigue, N. Sojic, L. Bouffier, A. Kuhn, **J. Am. Chem. Soc.** 143 (2021) 12708
[16] C. Zhang, H. Zhang, J. Pi, L. Zhang, A. Kuhn, **Angew. Chem. Int. Ed.** 61 (2022) e202111804
[17] M. Ketkaew, S. Assavapanumat, S. Klinyod, A. Kuhn, C. Wattanakit, **Chem. Comm.** 58 (2022) 4312
[18] S. Arnaboldi, G. Salinas, G. Bonetti, P. Garrigue, R. Cirilli, T. Benincori, A. Kuhn, **Angew. Chem. Int. Ed.** 61 (2022) e202209098

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PT-I-005

Kuhn Alexander

Prof. Kuhn studied chemistry at the Technical University of Munich, the University of Oxford and the University of Bordeaux. He completed his PhD in 1994 at the University of Bordeaux. After his post-doc at the California Institute of Technology, he was appointed Assistant Professor in Physical Chemistry at the University of Bordeaux in 1996 and Full Professor in 2000. His research interests cover a very broad spectrum of different topics in electrochemistry, including electroanalysis, electrocatalysis, bioelectrochemistry, electrodeposition, as well as micro- and nanoelectrochemistry. His work is documented in 10 patents and over 250 publications. He is a senior member of the Institut Universitaire de France, a Distinguished Senior Fellow of the French Chemical Society, and a Fellow of the International Society of Electrochemistry. He currently holds also an Adjunct Professor position at VISTEC, Thailand, and is a Distinguished Professor of the "Outstanding Talent Program" of Henan University, China.

PT-I-033

Theoretical models for Pt-based catalysts

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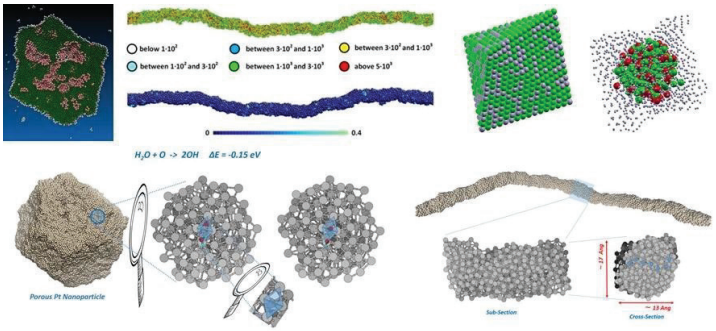
The widespread adoption of proton-exchange membrane fuel cell (PEMFC) devices for electrochemical energy conversion is currently limited by the lack of appropriate catalysts. Highly active and durable (under acidic condition) platinum-based (including alloyed) catalysts would be indispensable to accelerate the sluggish oxygen reduction reaction (ORR), but their development face serious issues, and has been slow and incremental, due to phenomena such as leaching and restructuring under the harsh ORR reaction conditions. In the present talk, I will present results of combined experimental and theoretical studies on nanostructured Pt-based alloy catalytic systems aimed at: (i) developing computational protocols to model the leaching of an electropositive element from Pt-based alloys, from the early simplified ones to the most recent accurate simulations based on neural network potentials; (ii) singling out the factors affecting activity and stability of Pt-based systems under ORR conditions. I will discuss how to disentangle the interplay of the various components of the coordination environment of exposed Pt atoms: surface structure, strain, and ligand effects, in determining the catalytic propensity and robustness. For surface structure effects, I will discuss first-principles simulations of ORR reaction paths on model configurations. I will then introduce descriptor quantities for strain and alloying effects, whence a binary descriptor these phenomena, defined simultaneously on experimental (X-ray absorption spectroscopy) and theoretical observables, and I will show how this binary descriptor can be used to predict not only the catalytic activity but also the durability of a wide range of Pt-alloy ORR catalysts.

Keywords: computational models; hydrogen fuel cells; ORR; volcano plots; keyword 5



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PT-I-033

Alessandro Fortunelli

Alessandro Fortunelli obtained his MS in Chemistry in 1983 from University of Pisa and Scuola Normale Superiore which also awarded him his PhD degree in Theoretical Chemistry in 2012. He joined the Italian National Research Council (CNR) in Pisa in 1984, and he has been working for CNR since then, currently as Research Director at the Institute of Chemistry of OrganoMetallic Compounds (ICCOM). In 2001-2003, he visited the groups of Emily Carter at UCLA and of Michael Ortiz at Caltech. Since 2012, he is Visiting Associate at the Division of Chemistry and Chemical Engineering collaborating with William A. Goddard III. He has developed methods for accelerating computational modeling in molecular and materials sciences, from quantum mechanics to stochastic sampling and global optimization, and applied these methods to metal nanoclusters/alloys, 2D and nanomaterials, amorphous carbon, and catalysis (homogeneous, heterogeneous, and electrochemical)..

PT-I-036

Sustainable management of water by photocatalytic degradation of toxic pollutants under natural solar light

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Promising strategy to fabricate visible-light-responsive photocatalysts is a challenging research topic in photocatalysis. In this talk, various heterojunctions including ZnO/Bi_2MoO_6, CdS/BiOBr, ZnO/ZnS, and g-C_3N_4/BiOCl/CdS were presented. The hydrothermal/solvothermal method was used for creation of the photocatalysts with the advantages of inexpensive, easy to control, and high yield of the product. The synthesized photocatalysts were characterized by using numerous techniques such as XRD, FT-IR, SEM, TEM, XPS, XAS and PL. The results confirmed that prepared heterojunctions showed enhance photocatalytic performance in comparison to those of the pristine photocatalysts. The photoactivity toward degradation of azo dyes (reactive red 141, Congo red) and antibiotics (ofloxacin, norfloxacin, oxytetracycline) under natural sunlight was reported. The generation heterostructure photocatalysts enhances the photocatalytic performance by suppressing the recombination of electron-hole pairs at the interface. The photodegradation of the pollutants followed pseudo-first order kinetics. The photocatalyst showed structural stability after seven cycles. The crucial species involved in the degradation of the pollutants was also investigated. Charge transfer at the ZnO/ZnS heterojunction is proposed. These works in our group provides a facile strategy for the interfacial engineering of heterojunctions with enhanced photocatalytic performance for environmental remediation.

Keywords: Photocatalyst; Antibiotics; Organic dyes; Wastewater treatment; Environmental protection

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PT-I-036

Suwat Nanan

Dr. Suwat Nanan got his B.S. degree in Chemistry from Khon Kaen University in 2001 and MSc degree in Physical Chemistry from Mahidol University in 2003. He then became a lecturer in the Department of Chemistry, Khon Kaen University in 2004. He finished his PhD in Chemistry (Conducting Liquid crystals) from University of Leeds, UK in 2009. He was promoted to assistant professor and associate professor in 2015 and 2020, respectively. His research interests focus on the development and fabrication of semiconducting photocatalysts for environmental protection including the creation of visible-light-driven photocatalysts for the complete removal of organic pollutants such as organic dyes, antibiotics, and insecticides in wastewater.

PT-I-039

Molecular Design using Modern Machine Learning Methods

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The three paradigms of scientific discovery and problem solving are experimentation, theory, and computation. Recent years are witnessing the emergence of data driven methods as the fourth paradigm not only in technology areas but also in fundamental sciences. Availability of data from previous experiments and computations combined with modern machine learning (ML) methods enable recognizing complex patterns that are helpful in discovering new molecules and materials. Such methods have been successfully applied to number of problems in chemistry and have been shown to provide much faster/accurate solutions compared to the traditional computational methods such as quantum mechanical calculations and molecular dynamics simulations. Initially, the fundamental differences between the traditional physics based methods and modern ML methods will be discussed following which examples of molecular property predictions such as quantum mechanical energies, solvation free energies and protein stability upon mutation will be presented. Finally, we will introduce 'inverse problems' in chemistry, discuss how solving this problem will enable efficient solutions and how modern ML methods helps us address this problem.

Keywords: artificial intelligence; machine learning; molecular design; property prediction; deep learning

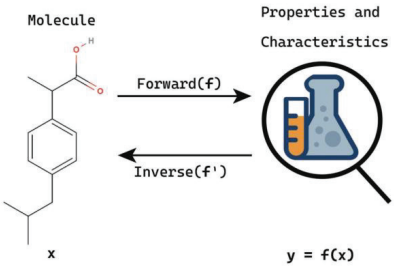

Figure 1: Direct and Inverse molecular design

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PT-I-039

U. Deva Priyakumar

After finishing PhD in computational chemistry from Pondicherry University and a postdoc at University of Maryland, Deva joined as an Assistant Professor at IIIT Hyderabad, where he is currently Profess, Head of CCNSB & IHub-Data. His research interests are in using computational methods and artificial intelligence methods for studying fundamental chemical and biological systems/process. He has received awards such as JSPS invitation fellowship, CRSI medal, INSA young scientist medal and Google impact scholar award.

PT-I-040

Buckybowl Chemistry: Interplay of Experiments and Theory

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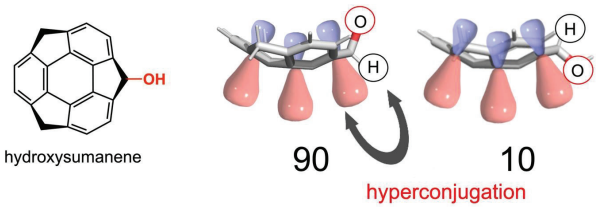
Bowl-shapedπ-conjugated compounds including partial structures of the fullerenes or cap structures of carbon nanotubes, which are called "buckybowls", are of importance not only as model compounds of fullerenes but also as their own chemical and physical properties [1]. For example, they show the characteristic dynamic behavior such as bowl-to-bowl inversion, applicable to the molecular-scale memory device [2]. In contrast, they sometimes favor stacking structures in a concave-convex fashion in the solid state [3], giving excellent electron conductivity. To understand the peculiar character of buckybowls, computational support is indispensable. For example, endo/exo selectivity at the benzylic position substitution can be explained by the facial difference in the stereo-electronic effect [4]. In this lecture, I demonstrate several topics on the interplay of experiments and the theory in buckybowl chemistry, particularly the sumanene derivatives [5].

Keywords: buckybowl; sumanene; curved pi system



References
[1] Recent reviews: M. Saito, H. Shinokubo, H. Sakurai, *Mater. Chem. Front.* **2018**, *2*, 635; H. Sakurai, *Bull. Chem. Soc. Jpn.* **2021**, *94*, 1579.
[2] S. Fujii, M. Zlatdinov, S. Higashibayashi, H. Sakurai, M. Kiguchi, *J. Am. Chem. Soc.* **2016**, *138*, 12142.
[3] H. Sakurai, T. Daiko, H. Sakane, T. Amaya, T. Hirao, *J. Am. Chem. Soc.* **2005**, *127,* 11580.
[4] S. Higashibayashi, S. Onogi, H. K. Srivastava, G. N. Sastry, Y.-T. Wu, H. Sakurai, *Angew. Chem. Int. Ed*. **2013**, *52*, 7314.
[5] H. Sakurai, T. Daiko, T. Hirao, *Science* **2003**, *301* 1878.

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PT-I-040

Hidehiro Sakurai

Hidehiro Sakurai received his Ph.D. degree from The University of Tokyo in 1994 under the direction of Professor Koichi Narasaka. After studying with Professor Narasaka as an Assistant Professor in Tokyo, and with Professor C. P. Casey as a JSPS Postdoctoral fellow at the University of Wisconsin–Madison, he joined Osaka University in 2000. In 2004, he moved to the Institute for Molecular Science (IMS). In 2014, he returned to Osaka University as a Professor at Division of Applied Chemistry. His current research interests include the science of buckybowls, nonplanar π-aromatic compounds, and the development of nanocatalysts.

PT-I-049

Integrating the innovative research for producing biogreen diesel over bifunctional metal phosphide catalysts

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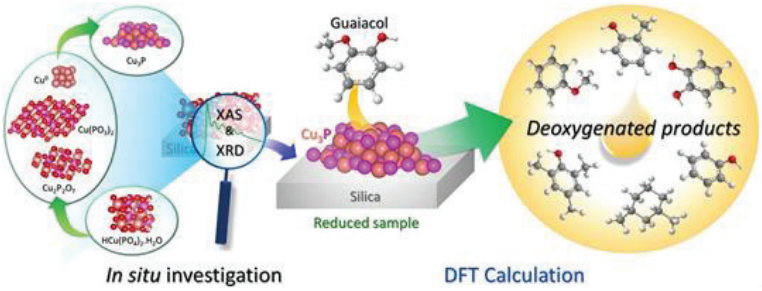
This work aims to develop a new kind of catalysts as metal phosphides for producing bio-hydrogenated diesel or bio-green diesel from oleic acid, palm oil, and guaiacol. The main activities consist of catalyst synthesis, advanced characterization, thermal catalysis through hydrodeoxygenation (HDO) reaction. The several advanced techniques in situ X-ray absorption spectroscopy (in situ XAS) and in situ X-ray diffraction (in situ XRD) were mainly applied in order to study the relationship between the structural property and catalytic performance. The density functional theory (DFT) was also provided to explore the detail of reaction mechanism. Regarding to the results, we can summarize all studies as followed as:

1. The NiP and CoP were found to be highly active and selective for removing oxygen via HDO reaction of oleic acid, palm oil, and guaiacol. The final products are alkane hydrocarbon or called bio-green diesel.
2. Type of supports has strongly affected on active species of metal phosphides which is related to the catalytic performance, activity, and selectivity. These phenomena have been explained by the results obtained from in situ XAS and XRD analyses, operating under in situ reduction condition.
3. Application of DFT calculation accompanied with *in situ* XAS and *in situ* XRD could advantage for explanation the reaction mechanism. This result is very useful for designing a new catalyst with high activity and selectivity. This could confirm the potential of innovation in frontier research.

Keywords: Biomass, metal phosphides, in situ XAS, bio-green diesel, DFT



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PT-I-049

Dr. Pongtanawat Khemthong

Pongtanawat Khemthong is senior researcher at Catalysis Research Team, National Nanotechnology Center (NANOTEC), National Science and Technology Development Agency (NSTDA). Pongtanawat did his BSc. and PhD at Ubon Ratchathani University and Suranaree University of Technology, respectively. He is working on the synthesis of nanoporous materials and advanced synchrotron-based characterization for catalysis and environmental. His got many awards including excellence invention (Research Institute of Creative Education, Vietnam), Bronze medal from iENA (Germany) and Silver medal form GENEVA (Switzerland) in recognition to CARBANO-Ag air filter. He also got Outstanding Achievement Award from NANOTEC (2019, 2020, 2021, 2022) and Excellent Team Research (2016) and Individual Research (2022) from National Research Council of Thailand.

CST AWARDEES 2022

CST Distinguished Chemist Award 2022 (Physical Chemistry)

From fundamental research to invention, innovation, and commercialization

Sanong Ekgasit[1,2]
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Fundamental research is an essential component of academic career development in universities and research institutes. As a chemist doing research in university, fundamental research is an instrument for building a team and surviving in the academic world while also nurturing future co-workers. I used basic research as a tool to stimulate my students' interest while also making them enjoy working on novel scientific problems that we can explore. In this special talk, I would like to share my experience with how our team transforms fundamental knowledge into invention, innovation, and commercial products. Our research theme is based on molecular spectroscopy, which is fundamental knowledge that all chemists must have to understand chemical and physical properties of substances. We do computer programming, wet laboratory analysis, and instrument design and construction. The skills we acquire along the way enable us to confidently communicate with people outside of chemistry. We must answer the questions of industries and businesspeople who want to commercialize our inventions and innovations by transforming our basic knowledge into commercial products. We must also learn the new skills on business, negotiation, and improvisation. The basic knowledge gained during fundamental research enables us to confidently answer almost all business-related questions. Our team could develop and commercialize nanomaterials and smartphone microscopes based on molecular spectroscopy research. Now, we use our knowledge on global issues, such as agricultural waste management and the use of bio-based materials for sustainable development, using green chemistry principles.

Keywords: nanomaterials, gold nanoparticles, silver nanoparticles, calcium carbonate nanoparticles, smartphone microscope

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CST Distinguished Young Chemist Award 2022 (Analytical Chemistry)

Wearable bioelectronics: Miniaturized sensors meet sustainable "green" energy devices

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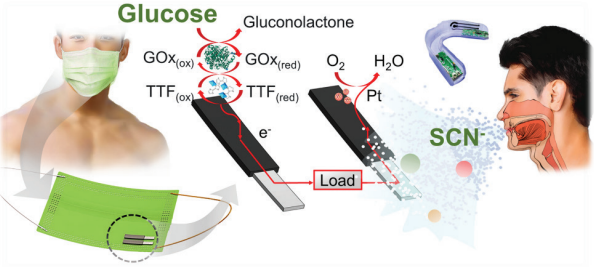
Wearable biosensors can provide bio/chemical information by directly measuring targets or biochemical markers in biofluids, such as sweat and saliva. One of the challenges in realizing wearable electronics is the power supply. Therefore, we explore a strategy to embed sensors and energy-efficient systems into wearables. We invented the first example of self-powered bioelectronics on a mask by leveraging printed biofuel-cells-based carbon nanotube-modified bioelectronics. The mask includes a biofuel cell (for harvesting energy), a supercapacitor (for storing energy), and a biosensor for detecting glucose levels. Biofuel cells convert biochemical energy into electricity through redox reactions. Hence, the device could be downsized by integrating harvesting and energy storage features with biosensing. Glucose fuel concentrations in a simulated biofluid determine the output current. In addition to the mask-based device, we developed a lab-in-a-mouth sensing device to analyze thiocyanate levels directly and noninvasively. To create this sensor, carbon electrodes were screen-printed and integrated with mouthguards. Using the newly developed mouthguard sensor and data analysis, biofouling can be mitigated, and salivary thiocyanate ions can be detected with high sensitivity and selectivity. We are currently many steps nearer to meeting the requirement for modern health care by monitoring physiological parameters using wearables. In addition to presymptomatic, preventive, and administrational medicine, these wearable devices can be used for smart healthcare. However, there are still numerous challenges to overcome and areas for development that should be considered.

Keywords: electrochemical sensors; wearable devices; energy devices; enzymatic biofuel cells; miniaturized devices



CST Award for Distinguished Contribution to Chemical Education 2022

Acid-base approximations in ideal solution revisited: Error analysis and its implications for teaching

Taweetham Limpanuparb[1]* and Junming Ho[2]
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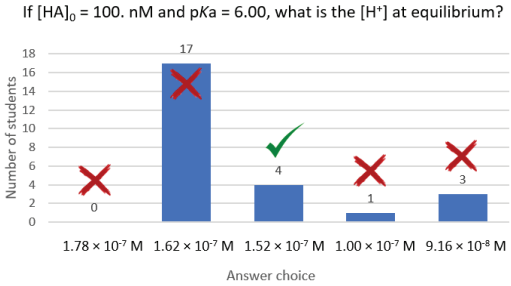
Solving for $[H^+]$ and pH in an ideal solution of mixture of monoprotic acid and base are typical problems of chemistry taught at secondary school level. Most textbooks describe the system by a quadratic equation derived from the dissociation constant of the relevant acid or base. Students are also taught approximation formulae as an efficient method to arrive at the answer. However, the problem is, in fact, simultaneous equilibria of acid/base dissociation and self-ionization of water. Even after assuming that activity coefficients are unity for lower-level undergraduate and high school, the correct mathematical description for this situation is still a cubic equation. We derived an analytical solution to this problem in a non-complex number form for the first time by using trigonometric functions. Errors resulting from the use of quadratic and various other versions of approximation including Henderson–Hasselbalch equation are discussed. The implications for the practice of acid-base teaching at the introductory level are manifold. For example, instructors are encouraged to embrace available computational tools in their teaching and to avoid misconceptions associated with the approximation process.

Keywords: acid-base, buffer, cubic equation; error analysis; Henderson–Hasselbalch equation;



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Wiley-CST Award for Contribution to Green Chemistry 2022

Morphologically controlled synthesis of advanced functional nanocatalysts for green energy and environmental applications

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Chemical transformation usually involves at least one catalytic step, and efficient catalysts are the key determining the successful chemical conversion. Nanotechnology is frontier research that could make profound understanding on catalytic behaviors at a molecular level possible. At National Nanotechnology Center (NANOTEC), we have developed the chemical approaches to synthesize various nanocatalyts with rich functionalities, as well as the state-of-the-art reaction systems for efficient catalysis. For example, advanced hydrothermal techniques were used to synthesize facet-controlled titanium dioxide (TiO_2) nanostructures that show high chemical selectivity (Fig. a-b), branched TiO_2 with different dimensions that has high surface area and improved charge transport efficiency (Fig. c-e), and porous TiO_2 with continuous three-dimensional frameworks (Fig. f). Single-atom catalysts supported on the novel continuous folding two-dimension nanostructure were synthesized by a facile one-pot pyrolysis (Fig. g). These unique nanostructured catalysts can be applied for photo-, thermal, and electrochemical catalysis. Working co-operatively with our engineering and theoretical simulation teams, high performance catalytic systems based on these functional nanocatalysts can be successfully built up for carbon dioxide reduction, generation of hydrogen energy, environmental remediation, and valorization of biomass wastes (Fig. h). Moreover, we have tried to engage both academic, industrial, public and private sectors to drive high-quality research to practical applications. These efforts are directly responsible for the governmental policies on Bio-, Circular, and Green (BCG) economy and Sustainable Development Goals (SDGs). The ultimate goals are to improve the quality of life of people in the society and to make greener environment driven by green chemistry approaches.

Keywords: catalysis; nanomaterials; biomass valorization; carbon dioxide reduction; hydrogen production

Shimadzu-CST Young Chemist Award 2022

Nano-photosensitizers for phototherapy enhancement

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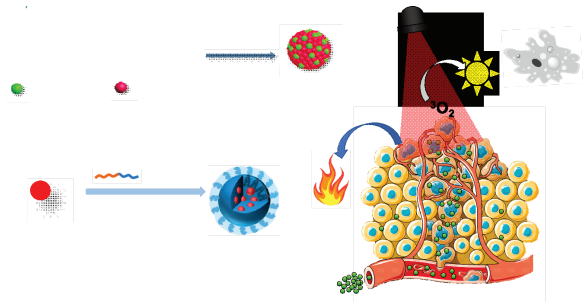
To reduce the growth rate of cancer, many researchers have been exploring better methods. In clinical, radiation therapy, surgery and chemotherapy are the mainstream procedures for cancer treatment. However, there are some serious side effects of those treatments. Thus, finding an alternative/better way to cure cancer is urgent. Therefore, our research advantage is to offer nanosystems that utilize noninvasive treatments which are photodynamic therapy (PDT), which is approved by FDA for clinical cancer therapy, and another promising modality called photothermal therapy (PTT). To date, researchers are motivated to develop better methods to improve the effectiveness of PDT and PTT and expand them to treat various types of cancer. One way to improve treatment efficacy is to develop photosensitizers (PSs) that can generate reactive oxygen species (ROS) or singlet oxygen ($^1O_2$) in PDT, or generate heat in PTT, which play an important role in destroying cancerous cells after they are triggered by light irradiation. One advantage of using light irradiation is to localize the area of cancer treatment without affecting healthy cells. In addition, some PSs have been used as imaging agents to monitor tumor accumulation of materials in the body as a guide for cancer treatment. To improve the efficacy of PSs entering cancer cells, my research uses nanoparticles (NPs) loaded PSs via the enhanced permeability and retention (EPR) effect. The prepared NPs can easily enter the cancer cells through the defective blood vessels that are derived from rapid vascularization, which allows the preferential accumulation of NPs at cancerous cells with poor lymphatic drainage. Hence, modified nanomaterials containing both phototherapy and imaging capabilities have received much attention in oncology for cancer diagnosis and therapy. Therefore, we developed a theranostic nanomedicine that combines diagnostic and therapeutic applications in a single agent. The results suggest that our NPs are promising nano-delivery systems for targeted cancer therapy.

Keywords: nano-delivery; aza-BODIPY; phototherapy; theranostic; cancer treatment



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Merck-CST Distinguished Dissertation Award 2022

Metal oxide photocatalysts for complete degradation of organic pollutants

Tammanoon Chankhanittha[1], Teeradech Senasu[1], Jirayus Piriyanon[1], Teerapong Narenuch[1], Khemika Wannakan[1], Naputsawan Komchoo[1], Jidapa Watcharakitti[1], Voranan Piyavarakorn[1], Varanya Somaudon[1], Tanyaporn Photiwat[1], Benjamin Johnson[2], Richard J. Bushby[2,3], Chavi Yenjai[4], Suwat Nanan[1]*

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This research focuses on preparation of the metal oxide photocatalysts for photodegradation of organic pollutants in wastewater. In the first paper, the hydrothermally grown Bi_2MoO_6 showed high efficiency of 90% toward photodegradation of azo dyes and fluoroquinolone antibiotics under visible light irradiation. In the second paper, the face-centered cubic Bi_4MoO_9, prepared by chemical precipitation method, showed an enhanced solar light-driven photoactivity of 100% toward degradation of Congo red dye in 30 min. In the third paper based on CTAB capped Bi_2WO_6 photocatalyst, the addition of surfactant remarkably affects the morphology and the photoactivity of the photocatalyst. In the fourth paper, ZnO/Bi_2WO_6 heterojunction was generated based on well dispersion of flower like Bi_2WO_6 on the surface of rod-like ZnO. The 0.05ZnO/BWO heterojunction with the smallest size and lowest PL intensity, implying highest electron-hole separation efficiency, exhibited the highest sunlight-driven photoactivity of 97% toward degradation of antibiotics. In the fifth paper, the ZnO/Bi_2MoO_6 heterojunction was fabricated by decoration of ZnO nanoparticles on the surface of the flower-like Bi_2MoO_6 superstructures. The PL intensity of the 10 wt% ZnO/Bi_2MoO_6 heterojunction was much lower than that of the bare Bi_2MoO_6, indicating much more effective separation of photo-generated electrons and holes at the interface which in turn resulted in greater expected photocatalytic performance. In the sixth paper, the well dispersion of metallic silver (1-5 wt%) on ZnO was performed. The 5Ag-ZnO photocatalyst, with 5 wt% Ag, showed excellent visible-light-responsive performance and improved anti-photo-corrosion property. In the seventh paper, the natural-product-capped ZnO nanoparticles was created. The stem extracts of *Dalbergia parviflora* namely formononetin and pinocembrin were used as capping agents for preparation of ZnO denoted as ZnO-1 and ZnO-2, respectively. The Capped-ZnO-2 photocatalyst, with the smallest average diameters of 10 nm, provided 100 % removal of RR141 dye and OFL antibiotic. Finally, the eight work is based on a facile creation of the ZnO/ZnS heterojunction by thermal treatment of hydrothermally grown ZnS in air atmosphere. The results confirmed the creation of ZnO/ZnS heterojunction after calcination of ZnS at 500 °C. The ZnS-500, containing ZnO/ZnS heterostructure, exhibited the highest photodegradation activity toward degradation of azo dyes and fluoroquinolone antibiotics. All in all, the works in our group demonstrates how to generate the promising sunlight-driven photocatalysts with high performance for environmental remediation.

Metrohm-CST Young Chemist Award 2022

Carbon-based electrochemical sensors for the detection of environmental contaminants

Keerakit Kaewket[1]* and Kamonwad Ngamchuea[1]
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In this work, we developed microporous carbon as an electrode and adsorbent material, as well as demonstrated the use of adsorptive stripping voltammetry (ASV) to analyze the adsorption characteristics of environmental contaminants on the carbon surface, including the adsorption isotherms and the oxidation states of the adsorbed species. Resorcinol and silver(I) (Ag^+) were used as examples of organic pollutants and toxic chemicals, respectively. Resorcinol adsorption on the microporous carbon followed Freundlich isotherm, while silver adsorption followed Redlich-Peterson isotherm. ASV further showed that Ag^+ ions were chemically reduced to Ag^0 upon the adsorption on microporous carbon surface. In addition to the adsorption process, the synergetic effects of enhanced electroactive surface area and thin-layer diffusion within the microporous structure on the electrochemical responses were elucidated. In addition to microporous carbon, we further developed electrospun carbon nanofibers (CNF) with anti-fouling properties to improve the performance of phenolic sensors where electrode fouling has been a major problem. Using resorcinol as a model system, the excellent analytical performance of the CNF electrodes was demonstrated, showing the sensitivity and limit of detection of 0.021 $\mu A\ \mu M^{-1}$ and 7.27 μM ($3s_B/m$), respectively. In addition to resorcinol, the electrochemical behaviors of CNF towards a wide range of redox processes were investigated, including reversible redox systems ($K_4Fe(CN)_6$ and catechol), the deposition and stripping of metal ions (Ag(I) and Cu(II)), and irreversible redox systems (resorcinol and bisphenol-A).

Keywords: electrochemical sensor; microporous carbon; carbon nanofiber; electrode fouling; phenolic compound

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DOW-CST Award for Distinguished School Science Teacher 2022
Lower Secondary Education

Improving chemistry laboratory through mini-scale experiment on factors affecting reaction rates

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Science and Technology
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The chemistry classroom of junior high school students has been limited to laboratory studies due to insufficient materials and chemicals. As such, we know that experimental tools can improve learning over short periods, but the effect of learning with tools on learning outcomes cannot be assumed. Here we present the positive impacts of mini-scale on improving the combined four experiments of factors affecting rate of chemical reaction designed for the junior high school laboratory. The chemical reaction rates were carried out in plastic dropper (5 ml) connected with a small balloon. The solvents and commercially available reagents including 20% HCl, 5% H_2O_2, 10% KI, H_2O, and aluminum foil sheet (0.5x0.5 cm) were used to conduct the reactions. The results indicated that the rate of a reaction depends on concentration, surface area, temperature and catalysts. This study demonstrates that tested laboratory experiments are convenient, inexpensive, and rapid, thereby providing an opportunity to introduce green chemistry into educational settings easily.

Keywords: mini-scale experiment; factors affecting reaction rates; green chemistry

DOW-CST Award for Distinguished School Science Teacher 2022
Upper Secondary Education

Comprehensive learning through paper-based sensors using green synthesized AuNPs for glucose detection

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Due to the fact that more than 50% of our world are developing countries; however, people need education to develop human personality, thoughts, dealing with others and prepares people for life experiences. Chemistry is a subject requiring experiments to make students have visualization. It will be hard to set up all chemical experiments in schools especially in remote area. Here, we proposed a single paper-based device for small-scaled comprehensive learning in electrochemistry, analytical chemistry, transition metals, and biology. Gold nanoparticles (AuNPs) were in-situ synthesized after folding the device for glucose detection. Au^{3+}, deposited on a sensor, was oxidized to red AuNPs by glucose, which is a reducing sugar. A smartphone was used to analyze red intensity proportional to glucose concentration. Moreover, the developed sensor offered the automatic sample introduction to reduce external equipment. The proposed device was utilized in chemistry classrooms and further applied in other application such as agricultural and medical testings.

Keywords: paper-based device; small-scaled learning; gold nanoparticles; electrochemistry

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Merck-CST-TYCN for Sustainable Future Award 2022

Discovery, engineering, and genetic code expansion of a polyethylene terephthalate hydrolase from the human saliva metagenome

Bhumrapee Eiamthong[1,+], Piyachat Meesawat[1,+], Thanakrit Wongsatit[1,+], Jariya Jitdee[2,+], Worawan Bhantumnavin[2,*], Chayasith Uttamapinant[1,*]

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[2]*Department of Chemistry, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand*

[+]*Equal contribution*

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Our team develops new technologies for bioremediation and green upcycling of plastics, the core contributor to the emission of CO_2 and other greenhouse gases, and one of the foci for the course correction by SDG13.3. We recently reported a bioinformatic pipeline and subsequent discovery of a new polyethylene terephthalate (PET) hydrolase, which we called MG8, from the human saliva metagenome. MG8 has robust PET plastic degradation activities under different salinity and temperature conditions, outcompeting several naturally occurring and engineered hydrolases in degrading PET. To expand functionalities of MG8, we genetically encoded 2,3-diaminopropionic acid (DAP) in place of the catalytic serine residue of MG8, thereby converting a PET-degrading enzyme into a covalent binder of PET. We show that MG8(DAP) can be used to attach protein cargos to PET as well as other polyester plastics, and when used in combination with a split green fluorescent protein, serves as a modular platform for bio-functionalization of PET and polyesters.

Keywords: polyethylene terephthalate; hydrolase; genetic code expansion; metagenome

SMALL-SCALE CHEMISTRY TEACHERS NETWORKING ABSTRACT

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Small-scale Chemistry Teachers Networking

Using small-scale chemistry to uncover information for teachers and students about how "simple" chemical processes used in schools, operate. However, there are barriers in the way.

Robert Worley FRSC, MSc
Senior Chemistry Advisor with the CLEAPSS School Science Service in the UK
Winner of the Royal Society of Chemistry Prize for Excellence in Secondary and Further Education

CLEAPSS advises (with SSERC for Scotland) all the schools in the UK on safety in practical science and design/technology taught to students aged to 18 years old. Small-scale chemical activities were developed to enable practical work on potentially high-risk activities, to be safer for students and teachers.

However, it became apparent that there were further benefits. Practical work was more focused and took less time which, with the greater classroom control, provided more teaching time. It allowed chemical information to be "chunked" together making learning less of a memory test.

Small scaling is "green" using less starting material, making less waste, cutting down on laboratory use of the utilities and recycling plastic equipment.

So why are teachers not making more use of it? One barrier comes from "teaching to the test". Traditional practicals and concepts are still used in exam specifications and National Curricula, taking no account of rising expense, advances in "green" chemistry and education research. The small-scale approach provides the same basis for advanced study by the minority of students as well as an understanding of science to the majority who follow other careers.

The talk will use a PowerPoint display with videos and photographs.

Keywords: chemical education; practical chemistry; small-scale chemistry, microchemistry, science teacher education; short and long term memory.

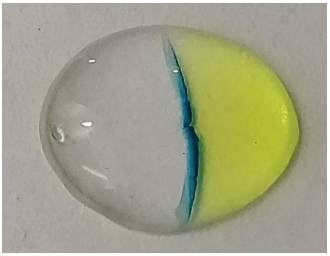

Fig 1 The precipitation of Prussian Blue in a 1.5cm diameter puddle of water on a plastic surface.

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ORAL PRESENTATION PROGRAM

AC - Analytical Chemistry

Friday, 20 January 2023 (PACCON 10, E4A-714)			
Time	**Code**	**Title**	**Presenter**
Chair: Assoc. Prof. Dr. Napaporn Youngvises; Co-Chair: Assoc. Prof. Dr. Awadh AlSuhaimi			
15.15-15.45	AC-I-108	Need, quality, and sustainability-NQS index for sustainable analytical chemistry	Prof. Dr. Kate Grudpan
15.45-16.15	AC-I-018	Exploring diverse analytical methods for identification of gallbladder cancer using bile as a specimen	Prof. Dr. Hoeil Chung
16.15-16.30	AC-O-024	Cu-Pd bimetallic nanoparticles modified screen-printed graphene electrode for selective determination of oxalic acid based on molecularly imprinted polymer	Mr. Anurak Weingkum

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AC - Analytical Chemistry (con't)

Saturday, 21 January 2023
(PACCON 10, E4A-714)

Time	Code	Title	Presenter
Chair: Assoc. Prof. Dr. Duangjai Nacapricha; Co-Chair: Assoc. Prof. Dr. Kontad Ounnunkad			
08.30-09.00	AC-I-066	The novel platforms for detection of infectious diseases	Prof. Dr. Orawon Chailapakul
09.00-09.30	CST Distringuished Young Chemist Award 2022	Wearable bioelectronics: Miniaturized sensors meet sustainable "green" energy devices	Asst. Prof. Dr. Itthipon Jeerapan
09.30-10.00	AC-I-054	Nanomaterial-mediated paper-based analytical devices for disease detection	Assoc. Prof. Akhmad Sabarudin
10.00-10.15	AC-O-002	Electrochemical detection of creatinine via copper-creatinine complex formation: Computational and experimental studies	Asst. Prof. Dr. Kamonwad Ngamchuea
10.15-10.30	AC-O-047	Toward personal home health-care kidney biomarker urinalysis	Ms. Waswan Prempinij
10.30-10.45	Coffee break		
Chair: Prof. Dr. Orawon Chailapakul; Co-Chair: Asst. Prof. Dr. Itthipon Jeerapan			
10.45-11.15	AC-I-106	Integration of functional nanomaterials with electrochemical amplification in developing sensitive immunosensors for clinical diagnostics	Assoc. Prof. Dr. Kontad Ounnunkad
11.15-11.30	AC-O-043	The invention of platinum-gold nanoparticle@carbon dot-graphene oxide in chitosan scaffold for prostate immunosensor	Ms. Suphaporn Chenkhuruthum
11.30-11.45	AC-O-051	Use of an Ag/AgCl electrode couple as a conductometric probe of glucose oxidase activity	Mr. Kawin Loha
11.45-12.00	AC-O-057	The Development of nitrogen-doped carbon dots/Ni-MnFe-layered double hydroxides (N-CDS/Ni-MnFe-LDHs) as immunoassay label for low-density lipoprotein detection	Mr. Akarapong Prakobkij
12.00-13.00	Lunch		

AC - Analytical Chemistry (con't)

Saturday, 21 January 2023
(PACCON 10, E4A-714)

Time	Code	Title	Presenter
Chair: Assoc. Prof. Dr. Weena Siangproh; Co-Chair: Assoc. Prof. Akhmad Sabarudin			
13.00-13.30	AC-I-085	Visible and near infrared hazardous ion sensors and strategies to improve visualization and fluorescent sensitivity	Prof. Dr. Nantanit Wanichacheva
13.30-13.45	AC-O-059	A novel spirooxazine derivative as a colorimetric probe for Fe(II) and Pb(II) determination in water samples based on a microfluidic paper-based analytical device (μPAD) for maintaining photochromic efficiency	Ms. Nattasa Kitchawengkul
13.45-14.00	AC-O-028	Carbon dots in highly sensitive and selective capsaicin and 17β-estradiol electrochemical sensors	Dr. Preeyanuch Supchocksoonthorn
14.00-14.15	AC-O-058	Nitrogen-doped graphene quantum dots (N-GQDs) as fluorescent paper-based test kit for selective and sensitive cyanide in food monitoring	Ms. Nutthaporn Malahom
14.15-14.30	AC-O-075	Electrochemical detection in gas phase for direct determination of sulfite residue in frozen shrimp	Ms. Nanthatchaphon Jantawong
14.30-14.45	AC-O-072	Carbon nanotube-modified graphene sensor for voltammetric detection of 2,4,6-trinitrotoluene explosive and a drone sampling method	Mr. Paithoon Prasertying
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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AC - Analytical Chemistry (con't)

Saturday, 21 January 2023 (PACCON 10, E4A-715)			
Time	**Code**	**Title**	**Presenter**
Chair: Assoc. Prof. Dr. Rodjana Burakham; Co-Chair: Assoc. Prof. Dr. Purim Jarujamrus			
08.30-09.00	AC-I-107	Synthesis of silica nanoparticles modified with metal chelators for SPE of trace metals from water samples	Assoc. Prof. Dr. Awadh AlSuhaimi
09.00-09.30	AC-I-109	Synthesis of sorbents for solid-phase extraction and its application to flow analysis	Prof. Dr. Norio Teshima
09.30-09.45	AC-O-034	Optimization of enrofloxacin (ENR) and ciprofloxacin (CIP) in fish samples by high-performance liquid chromatography coupled with fluorescence detector (HPLC-FLD) by using tetracycline (TC) as internal standard	Mr. Dyveasna Nath
09.45-10.00	AC-O-076	Cost-effective long-path absorption liquid core waveguide with a gas diffusion flow analysis system for ammonium determination	Mr. Wasin Somboot
10.00-10.15	AC-O-063	A novel fluorometric paper-based sensor for sensitive determination of Cd(II) in water and herbal medicine samples by using nitrogen-doped graphene quantum dots	Ms. Puttaraksa Naksen
10.30-10.45	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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CC – Catalytic Chemistry

Saturday, 21 January 2023
(PACCON 4, E4A-614)

Time	Code	Title	Presenter
Chair: Prof. Dr. Suttichai Assabumrungrat; Co-Chair: Prof. Dr. Metta Chareonpanich			
08.30-09.00	CC-I-044	Nanocatalysts and nanomaterials for catalytic C1 conversion towards sustainable development goals	Prof. Dr. Metta Chareonpanich
09.00-09.30	CC-I-041	Green reduction route via ethanol dehydrogenation and decomposition for Pd-promoted Co3O4/SBA-15 catalysts in reverse water gas shift reaction: An operando time-resolved X-ray absorption spectroscopy investigation	Prof. Dr. Jatuporn Wittayakun
09.30-09.45	CC-O-033	Polymer-based catalytic systems from click reactions: Towards sustainable chemical reactions	Assoc.Prof.Dr. Preeyanuch Sangtrirutnugul
09.45-10.00	CC-O-030	Hydrodeoxygenation of fatty acid methyl esters (FAMEs) over copper phyllosilicate catalysts (CuPS)	Associate Professor Dr. Kittisak Choojun
10.00-10.15	CC-O-025	Effect of calcium-modified mixed metal oxide supported nickel catalyst in dry reforming reaction	Asst. Prof. Dr. Waleeporn Donphai
10.15-10.30	CC-O-011	Polymer coated Cu for electrocatalytic CO2 reduction to C2 products	Ms. Emut Sukma Sejati
10.30-10.45	Coffee break		
Chair: Prof. Dr. Suttichai Assabumrungrat; Co-Chair: Prof. Dr. Metta Chareonpanich			
10.45-11.15	CC-I-042	Dendrimer assisted synthesis of bimetallic nanoparticles and their catalytic applications	Prof. Dr. Md. Wahab Khan
11.15-11.45	CC-I-040	High performance iron oxide/carbon nanocatalysts for the decomposition of methylene blue	Assoc. Prof. Dr. Ekasith Somsook
11.45-12.00	CC-O-009	Production of hierarchical faujasite from waste sand as adsorbent for methylene blue dye removal	Mr. Krissanapat Yomthong
12.00-13.00	Lunch		

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CC – Catalytic Chemistry (con't)

Saturday, 21 January 2023 (PACCON 4, E4A-614)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Jatuporn Wittayakun; Co-Chair: Assoc. Prof. Dr. Shun Nishimura			
13.00-13.30	CC-I-043	Hexagonal mesoporous silica supported with bimetallic Fe-Ni to produce sustainable biofuel via deoxygenation under hydrogen-free condition	Prof.Dr. Joon Juan
13.30-14.00	CC-I-034	Machine learning-assisted investigation of heterogeneous catalyst: A case study at oxidative coupling of methane	Assoc. Prof. Dr. Shun Nishimura
14.00-14.15	CC-O-005	A density functional theory study on how external oxygen enhances the Fe2O3 catalyst stability during hydrogen sulfide removal process	Ms. Sorawee Setasuban
14.15-14.30	CC-O-031	Magnetic mesoporous carbon acid catalysts prepared via facile self-assembly method and their use in conversion of xylose into furfural	Mr. Piyamit Toumsri
14.30-14.45	CC-O-038	Catalytic activity of gold nanoparticles deposited on citric acid-modified surface-fibrillated cellulose	Ms. Butsaratip Suwattananuruk
14.45-15.00	CC-O-008	Diesters from ring opening of epoxides and acid anhydrides using chromium-salen binary system	Ms. Neen Phan-udom
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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CC – Catalytic Chemistry (con't)

Saturday, 21 January 2023
(PACCON 5, E4A-615)

Time	Code	Title	Presenter
Chair: Prof. Dr. Önder Metin; Co-Chair: Asst. Prof. Chularat Wattanakit			
08.30-09.00	CC-I-017	Rational design of heterostructured photocatalysts for sustainable chemical conversions	Prof. Dr. Önder Metin
09.00-09.30	CC-I-002	Fabrication of hierarchical zeolites for bioethanol upgrading: From laboratory-scale to pilot-scale	Asst. Prof. Chularat Wattanakit
09.30-09.45	CC-O-006	Ce-based catalyst for DMC synthesis by indirect-urea alcoholysis route	Mr. Thanapat Wattanaserarat
09.45-10.00	CC-O-020	Low C-C coupling barrier for ethanol synthesis on non-metal doped graphyne driven by bond order conservation and flexible orbital hybridization	Mr. Poobodin Mano
10.00-10.15	CC-O-027	Preparation and characterization of sulfated CaO catalyst for biodiesel production	Mr. chatchawin dulyamahakamtorn
10.15-10.30	CC-O-028	Electrocatalytic reduction of carbon dioxide on SnO2 nanorods to formate	Mr. Nuttapong Sittikul
10.30-10.45	Coffee break		
Chair: Prof. Dr. Önder Metin; Co-Chair: Asst. Prof. Chularat Wattanakit			
10.45-11.15	CC-I-045	Technology translation out of the laboratory into commercial reality	Prof. Dr. Thomas Maschmeyer
11.15-11.30	CC-O-010	In-situ hydrogenation of furfural to tetrahydrofurfuryl alcohol over monometallic catalyst supported on hierarchical MFI zeolite	Ms. Anittha Prasertsab
11.30-11.45	CC-O-021	Effect of alkali treatment time on structural modification of commercial and synthesized ZSM-5 zeolites for use as cracking and reforming catalyst	Mr. Suttipong Singhyakaew
11.45-12.00	CC-O-039	Catalytic transfer hydrogenation of furfuryl alcohol to gamma-valerolactone by using Y zeolites and Cu/Y catalysts	Mr. Thanisorn Rattanapornchaiwat
12.00-13.00	Lunch		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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CE - Chemical Education

Saturday, 21 January 2023 (PACCON 9, E4A-709)			
Time	**Code**	**Title**	**Presenter**
Chair: Asst. Prof. Dr. Chanyah Dahsah; Co-Chair: Asst.Prof.Dr.Acharavadee Bunkoom			
10.45-11.15	CE-I-014	Empower chemistry education in a sustainable future	Asst. Prof. Dr. Chanyah Dahsah
11.15-11.30	CE-O-001	The chemistry link: Enhancing school children's chemistry interest via university experience	Assoc. Prof. Dr. Binti Othaman
11.30-11.45	CE-O-015	A kinetic experiment of "breathalyzer" reaction using smartphone	Ms. Punnatron Kongsithiseth
12.00-13.00	Lunch		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

EE - Environmental Chemistry and Renewable Energy

Saturday, 21 January 2023
(PACCON 14, E4A-718)

Time	Code	Title	Presenter
Chair: Prof. Dr. Kwok Feng Chong; Co-Chair: Asst. Prof. Dr. Khamphe Phoungthong			
09.00-09.30	EE-I-046	Engineering tungsten oxide for energy storage applications	Prof. Dr. Kwok Feng Chong
09.30-10.00	EE-I-042	Source apportionment of pm 2.5 during smoke haze and non-smoke haze periods in northern Thailand	Assoc. Prof. Dr. Somporn Chantara
10.00-10.15	EE-O-014	Direct synthesis of liquefied petroleum gas from carbon dioxide over bifunctional catalyst, cuznal/various zeolite types supporting tandem reaction	Dr. Ing. Chiraphat Kumpidet
10.15-10.30	EE-O-009	Atomically dispersed crystalline cobalt tungstate/amorphous cobalt boride heterostructure and nitrogen-codoped multiwalled carbon nanotube@reduced graphene oxide nanoribbon toward catalysis of oxygen reduction	Mr. theerawat dudngam
10.30-10.45	Coffee break		
Chair: Prof. Dr. Wanida Jinsart; Co-Chair: Dr. Tharakorn Maneerat			
10.45-11.15	EE-I-043	Biological sample analysis in Occupational health and safety: Case study in the waste disposal plants	Prof. Dr. Wanida Jinsart
11.15-11.30	EE-O-002	Fluorometric chemosensor based on excited-state intramolecular proton-transfer (ESIPT) characteristic for ultrasensitive detection of Cu^{2}+ ion in aqueous media and its application in environmental monitoring and bioimaging	Dr. Pornthip Piyanuch
11.30-11.45	EE-O-010	Platinum and PtNi nanoparticle-supported multiwalled carbon nanotube electrocatalysts prepared by one-pot pyrolytic synthesis with an ionic liquid for dye-sensitized solar cells	Mr. Thunyathron Sanjailuk
11.45-12.00	EE-O-028	Filter paper-based nanoplastics detection using surface-enhanced Raman scattering	Ms. Mary Jane Balani
12.00-13.00	Lunch		

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EE - Environmental Chemistry and Renewable Energy (con't)

Saturday, 21 January 2023 (PACCON 14, E4A-718)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Perapong Tekasakul; Co-Chair: Assoc. Prof. Dr. Somporn Chantara			
13.00-13.30	EE-I-045	Recent advancement of atmospheric nanoparticle research in Southeast Asia	Prof. Dr. Perapong Tekasakul
13.30-13.45	EE-O-035	The production of green diesel by Fischer-Trospch synthesis over cobalt-based catalysts supported on various carriers	Ms. Sreypov Ke
13.45-14.00	EE-O-034	Development of cobalt-based structured catalyst for production of green diesel by Fischer-Trospch synthesis	Ms. Pronprom Aurud
14.00-14.15	EE-O-017	Preparation of porous MIL-53(Fe)-loaded Cellulose/HPMC aerogels as an efficient Arsenic removal adsorbent	Mr. Fikri Haikal
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

FA - Food and Agricultural Chemistry

Saturday, 21 January 2023 (PACCON 9, E4A-709)			
Time	**Code**	**Title**	**Presenter**
Chair: Assoc. Prof. Dr. Manat Chaijan			
11.45-12.00	FA-O-005	Discrimination of weedy rice using near infrared spectroscopy (NIR) and hyperspectral NIR image combined with modified self-organizing maps (SOMs)	Dr. Sureerat Makmuang
12.00-13.00	Lunch		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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IC - Inorganic Chemistry

Saturday, 21 January 2023
(PACCON 1, E4A-607)

Time	Code	Title	Presenter
Chair: Prof. Dr. Thawatchai Tuntulani; Co-Chair Asst. Prof. Kullapa Chanawanno			
09.00-09.30	IC-I-001	Molecular magnetic switches: Rational design of spin crossover materials	Assoc. Prof. Dr. David J. Harding
09.30-10.00	IC-I-016	Creation of a variety of metallosupramolecular compounds based on gold(I) metalloligands with D-penicillamine	Prof. Dr. Takumi Konno
10.00-10.15	IC-O-006	Highly active metal complexes supported by constrained Schiff-base ligands: Success story in homogeneous catalysis	Assoc. Prof. Dr. Khamphee Phomphrai
10.15-10.30	IC-O-009	Titanium complexes of phenoxy-azo and phenoxy-imine ligands: a comparative study for the ring-opening polymerization of rac–lactide and ε–caprolactone	Mr. Wasan Joopor
10.30-10.45	Coffee break		
Chair: Prof. Dr. Thawatchai Tuntulani; Co-Chair Asst. Prof. Kullapa Chanawanno			
10.45-11.15	IC-I-005	Design and characteristic features of electron-rich boron-containing cyclic molecules	Prof. Dr. Rei Kinjo
11.15-11.30	IC-O-010	Synthesis and characterization of aluminum enolate complexes for the ring-opening (co)polymerization of rac-Lactide, ε-caprolactone and ε-decalactone	Ms. Sirawan Kamavichanurat
11.30-11.45	IC-O-019	Controlled ring-opening polymerization of macrolactones: A pursuit of active aluminum-based catalysts	Ms. Chutikan Nakornkhet
11.45-12.00	IC-O-020	Multifunctional bis-BODIPY linked-triazole chemosensors	Assoc. Prof. Dr. Supavadee Kiatisevi
12.00-13.00	Lunch		

IC - Inorganic Chemistry (con't)

Saturday, 21 January 2023 (PACCON 1, E4A-607)			
Time	**Code**	**Title**	**Presenter**
Chair: Assoc. Prof. Kittisak Choojun; Co-Chair Dr. Thitipone Suwunwong			
13.00-13.30	IC-I-013	Blueprint for a modern sustainable phosphorus chemistry	Prof. Dr. Jan J. Weigand
13.30-13.45	IC-O-023	Catalytic and gas adsorption properties in a novel metal organic framework based on 1,3,5-tris(4-carboxyphenyl) benzene acid	Dr. Raul Diaz Torres
13.45-14.00	IC-O-011	Nanosilica derived from biomass power plant bottom ash	Ms. Natchaya Atibaedya
14.00-14.15	IC-O-014	Adsorption–desorption of potassium ion on rice husk ash	Ms. Pimchanok Patho
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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IE - Industrial and Engineering Chemistry

Saturday, 21 January 2023 (PACCON 7, E4A-707)			
Time	**Code**	**Title**	**Presenter**
Chair Asst. Prof. Dr. Pannipha Dokmaingam; Co-Chair Dr. Prathak Jienkulsawad			
09.00-09.30	IE-I-014	Hydrogen: Energy for the Future	Dr. Sumittra Charojrochkul
09.30-09.45	IE-O-003	A kinetic monte carlo simulation of shale gas storage and production in homogeneous and heterogeneous shale matrix	Htet Myet Tun
09.45-10.00	IE-O-004	Biogas production enhancement in anaerobic batch bioreactor from Napier grass using magnetite particles	Ting-Wu KO
10.00-10.30	IE-I-002	Green biohythane technology and its applications	Prof. Dr. Chen-Yeon Chu
10.30-10.45	Coffee break		
Chair. Prof. Dr. Sanong Ekgasit; Co-Chair.:Assoc. Prof. Dr. Darunee Wattanasiriwech			
10.45-11.15	IE-I-013	GC journey to net zero	Ms. Napaporn Ratanapoka
11.15-11.30	IE-O-001	Effect of Fe doping on TiO_2 photocatalyst for Indigo carmine photodegradation	Satit Phiyanalinmat
11.30-11.45	IE-O-005	High purity silver microstructure recovered form silver wastes with controllable shape by using polymeric stabilizer	Natsuda Muankhajorn
12.00-13.00	Lunch		

IE - Industrial and Engineering Chemistry (con't)

Saturday, 21 January 2023 (PACCON 7, E4A-707)			
Time	**Code**	**Title**	**Presenter**
Chair: Asst. Prof. Suthee Wattanasiriwech; Co-Chair: Asst. Prof. Dr. Chuleeporn Thanomsilp			
13.00-13.30	IE-I-018	Bio-CaCO3 from green mussel shells: A high value blue-material from seafood waste	Prof.Dr. Sanong Ekgasit
13.30-13.45	IE-O-007	Titanium dioxide nanoparticles on porous carbon media for azo-dye wastewater treatment	Saitharn Limsakul
13.45-14.00	IE-O-010	Catalyst derived from spent coffee grounds for azo dye degradation	Manunchaya Jaideekard
14.00-14.30	IE-I-017	Driving innovations for sustainable waste management with extended producer responsibility	Asst. Prof. Dr. Panate Manomaivibool
14.30-14.45	IE-O-011	Synthesis of activated carbon from turmeric waste by using microwave	Siraporn Zumsiri
14.45-15.00	IE-O-012	Techno-economic analysis of succinic acid production from sugarcane molasses	Apitsada Rongsawad
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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MN - Material Chemistry and Nanotechnology

Friday, 20 January 2023 (PACCON 6, E4A-716)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. David Jenkins; Co-Chair: Asst. Prof. Dr. Nattakan Soykeabkaew			
15.15-15.45	MN-I-072	Bio-inspired catechol-functionalized poly(hydroxyethyl acrylate-co-itaconic acid)/hyaluronic acid hydrogel adhesive patches for transdermal drug delivery	Assoc. Prof. Dr. Prasopchai Patrojanasophon
15.45-16.00	MN-O-015	Hydrazide naphthalimide functionalized spherical silica nanoparticles for detection of aromatic aldehyde	Mr. Sukprasert Sararit
16.00-16.15	MN-O-017	Ag/AgO nanoparticles embedded electrospun natural rubber/ polyacrylonitrile based carbon nanofibers for tunable antibacterial activity	Mr. Songwuit Chanthee

Friday, 20 January 2023 (PACCON 6, E4A-717)			
Time	**Code**	**Title**	**Presenter**
Chair:Prof. Dr. Fabrice Goubard Co-Chair: Asst. Prof. Dr. Sitthi Duangphet			
15.15-15.45	MN-I-062	Electrochromic devices with stacked cyan, magenta and yellow pixels architecture	Prof. Dr. Pierre-Hensri Aubert
15.45-16.00	MN-O-029	Reveal the dynamic solid electrolyte interphase formation of Li-based water-in-salt electrolyte under optical observation	Ms. Rossukon Jommongkol
16.00-16.15	MN-O-068	Artificial intelligence for prediction of battery and supercapacitor material	Dr. Siraprapha Deebansok
16.15-16.30	MN-O-063	Teaching an old reaction new tricks: Diazo coupling enables porous organic polymers for anode materials for lithium-organic batteries	Dr. Natthawat Semakul

MN - Material Chemistry and Nanotechnology (con't)

Saturday, 21 January 2023
(PACCON 12, E4A-716)

Time	Code	Title	Presenter
Chair: Prof. Dr. Mustafa Culha; Co-Chair: Asst. Prof. Dr. Nattakan Soykeabkaew			
09.00-09.30	MN-I-056	Research on effect of hybrid eco-reinforcement on mechanical properties of polypropylene matrix composites	Prof. Song Jung-il
09.30-10.00	MN-I-013	Flexible thermoelectric generator from bacterial cellulose/Ag2Se Nanocomposites	Assoc. Prof. Dr. Supree Pinitsoontorn
10.00-10.15	MN-O-061	Preparation of immobilized bacterial nanocellulose and its applications as alternative material for sensing of hydrogen peroxide and trivalent chromium	Mr. Pongpichet Srikritsadawong
10.15-10.30	MN-O-047	Cellulose nanofibrils from sugarcane leaves as Pickering emulsion for controlled release of essential oils	Mr. Pittaya Songchom
10.30-10.45	Coffee break		
Chair: Prof. Dr. Vinich Promarak; Co-Chair: Asst. Prof. Dr. Nattakan Soykeabkaew			
10.45-11.15	MN-I-025	Water soluble quaternized cyclodexrin grafted chitosan: synthesis, properties, and its potential drug delivery application	Dr. Uracha Ruktanonchai
11.15-11.30	MN-O-040	Riboflavin functionalized PLGA nanoparticles to enhance cellular uptake in breast cancer cells	Asst. Prof. Dr. Kanlaya Katewongsa
11.30-11.45	MN-O-014	Formulation, characterization and in vitro evaluation of vitamin-loaded nanoparticle	Ms. Siriratchakorn Sathiensathaporn
11.45-12.00	MN-O-037	Hybrid biocompatible carbon dots-ZnO nanoparticles with enhanced broadband UV protection and antioxidant properties	Ms. Pattaraporn Nuntahirun
12.00-13.00	Lunch		

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MN - Material Chemistry and Nanotechnology (con't)

Saturday, 21 January 2023 (PACCON 12, E4A-716)			
Time	**Code**	**Title**	**Presenter**
Chair: Assoc. Prof. Dr. Tetsuro Kusamoto; Co-Chair: Asst. Prof. Dr. Nattakan Soykeabkaew			
13.00-13.30	MN-I-008	Safe-by-design for nanomaterial safety: an emphasis on surface chemistry	Prof. Dr. Mustafa Culha
13.30-14.00	MN-I-009	Controlling 1D metal-organic nanotube (MONT) synthesis in nanomaterials	Prof. Dr. David Jenkins
14.00-14.15	MN-O-030	Effect of surface modification of magnesium ferrite nanoparticles on selective adsorption of congo red from single and binary dyes solutions	Mr. Supawitch Hoijang
14.15-14.30	MN-O-016	Improving thermostability of bromelain via immobilization onto clay–carboxymethylcellulose composites for aquafeed application	Ms. Kanlayanit Pimcharoen
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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MN - Material Chemistry and Nanotechnology (con't)

Saturday, 21 January 2023 (PACCON 13, E4A-717)			
Time	**Code**	**Title**	**Presenter**
Chair: Assoc. Prof. Dr. Olivier Fontaine; Co-Chair: Asst. Prof. Dr. Sitthi Duangphet			
09.00-09.30	MN-I-049	Advanced porous materials synthesized by template method	Prof. Dr. Hirotomo Nishihara
09.30-10.00	MN-I-032	Spin-correlated photoluminescence of open-shell molecules	Assoc. Prof. Dr. Tetsuro Kusamoto
10.00-10.15	MN-O-001	Enantioselective synthesis of chiral compounds on chiral encoded mesoporous copper surfaces	Mr. Banyong Suwankaisorn
10.15-10.30	MN-O-055	Synthesis and modification of zeolite NaY for catalyzing the H_2 generation from hydrolysis of $NaBH_4$ reaction.	Mr. Jatsadakron Chatsen
10.30-10.45	Coffee break		
Chair:Prof. Dr. Pierre-Hensri Aubert Co-Chair: Asst. Prof. Dr. Sitthi Duangphet			
10.45-11.15	MN-I-048	Stretchable and transparent conductive PEDOT: PSS-based electrodes for organic photovoltaics.	Prof. Dr. Fabrice Goubard
11.15-11.30	MN-O-046	The effect of pH and additive on the photocatalytic reduction of CO_2 to methanol using Cu/ZnO nanostructured catalyst	Mr. Akkradach Chotnitisuwan
11.30-11.45	MN-O-065	High-performance perovskite solar cells with methylamonium lead iodide quantum dots	Mr. Pattanasak Tipparak
11.45-12.00	MN-O-053	Fast responsive and high sensitivity of NH_3 gas sensor fabricated 2D-TiO_2 nanosheet	Asst. Prof. Dr. Sutasinee Kityakarn
12.00-13.00	Lunch		

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MN - Material Chemistry and Nanotechnology (con't)

Saturday, 21 January 2023 (PACCON 12, E4A-716)			
Time	**Code**	**Title**	**Presenter**
Chair:Prof. Dr. Hirotomo Nishihara Co-Chair: Asst. Prof. Dr. Sitthi Duangphet			
13.00-13.30	MN-I-028	Nitrogen and oxygen doped vertically aligned carbon nanotubes (VACNT) for high-energy ultracapacitors	Assoc. Prof. Dr. Philippe Banet
13.30-14.00	MN-I-002	Fundamental science and the pressing need for battery electrolytes for Thailand	Assoc. Prof. Dr. Olivier Fontaine
14.00-14.15	MN-O-011	Co-decorated lignin-based carbon nanofibers as binder-free electrode materials for supercapacitor	Ms. Thanigan Nakkhong
14.15-14.30	MN-O-039	Biomass carbon derived from oil palm leaves for high-voltage aqueous supercapacitors	Dr. Santamon Luanwuthi
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

NP - Natural Products, Biological Chemistry and Chemical Biology

Friday 20 January 2023 (PACCON 2, E4A-608)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Wim Vanden Berghe; Co-Chair: Asst. Prof. Dr. Ekachai Chukeatirote			
15.15-15.45	NP-I-079	Natural products for drug discovery in the era of personalized medicine	Prof. Dr. Chatchai Muanprasat
15.45-16.00	NP-O-066	The effects of microwave inducement towards inclusion complex formation by nanoencapsulation of linalool	Purin Sathirathai
16.00-16.15	NP-O-043	Integrated genomic-metabolomic analyses for natural product discovery in Streptomyces sp. TBRC 11456	Thapanee Pruksatrakul
16.15-16.30	NP-O-076	Discovery of a potent and selective covalent inhibitor and activity-based probe for the deubiquitylating enzyme UCHL1, with antifibrotic activity	Nattawadee Panyain

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NP - Natural Products, Biological Chemistry and Chemical Biology (con't)

Saturday 21 January 2023
(PACCON 2, E4A-608)

Time	Code	Title	Presenter
Chair: Prof. Dr. Somdej Kanokmedhakul; Co-Chair: Asst. Prof. Dr. Cholpisut Tantapakul			
09.00-09.30	NP-I-023	Discovery of novel bioactive secondary metabolites from hypoxylaceous fungi using polythetic taxonomy, phylogenomics and metabolomics	Prof. Dr. Marc Stadler
09.30-09.45	NP-O-049	Bioactive secondary metabolites from ash endophytes	Özge Demir
09.45-10.00	NP-O-033	Isolation and characterization of nematicidal and antimicrobial agents from three fungal *Phaeosphaeriaceous* species	Natalia A. Llanos-López
10.00-10.15	NP-O-011	Dimeric aporphine alkaloids of *Trivalvaria costata* and their α-glucosidase inhibitory activity	Passakorn Teerapong-pisan
10.15-10.30	NP-O-021	Secondary metabolites of three *Bignoniaceae* species from Thailand	Wuttichai Jaidee
10.30-10.45	Coffee break		
Chair: Prof. Dr. Marc Stadler; Co-Chair: Dr. Virayu Sutthipasilp			
10.45-11.15	NP-I-003	Towards eco-sustainable marine phytochemical cancer treatment applications	Prof. Dr. Wim Vanden Berghe
11.15-11.30	NP-O-031	Chemical constituents from leaves and twigs of *Phyllanthus mirabilis* and their cytotoxic activity	Apisara Somteds
11.30-11.45	NP-O-010	Styryl lactone derivatives and aristolactam alkaloids from *Goniothalamus tapis* Miq. and their α-glucosidase inhibitory activity	Piyaporn Phukhatmuen
11.45-12.00	NP-O-024	Evaluation of antimicrobial and anti-biofilm activities of flavonoids from *Kaempferia parviflora* against phytopathogenic bacteria	Dan-Dan Yang
12.00-13.00	Lunch		

NP - Natural Products, Biological Chemistry and Chemical Biology (con't)

Saturday 21 January 2023 (PACCON 2, E4A-608)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Chatchai Muanprasat; Co-Chair: Assoc. Prof. Dr. Panupong Puttarak			
13.00-13.30	NP-I-009	Studies towards the mode of action of plazomicin, a new aminoglycoside antibiotic	Prof. Dr. Dev P. Arya
13.30-13.45	NP-O-065	Development of novel non-polymerized probes for protein-protein interaction by peroxidase-based proximal labeling in live cells	Pornchai Kaewsapsak
13.45-14.00	NP-O-032	Molecular insights into the pore-forming mechanisms of human defensin 5	Prapasiri Pongprayoon
14.00-14.15	NP-O-038	Predicted inclusion complexes of sorafenib and regorafenib with cyclodextrins: A computational study	Aamir Aman
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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OM - Organic Synthesis and Medicinal Chemistry

Friday, 20 January 2023
(PACCON 3, E4A-609)

Time	Code	Title	Presenter
Chair: Prof. Dr. Tirayut Vilaivan; Co-Chair: Assoc. Prof. Dr. Kwanruthai Tadpetch			
15.15-15.45	OM-I-007	Design and synthesis of new antiviral agents with broad-spectrum	Prof. Dr. Reuben J.-R. Hwu
15.45-16.00	OM-O-050	Identification of a potential anti-dengue agent by in silico screening of compounds found in ginseng and notoginseng	Dr.Ruchuta Ardkhean
16.00-16.15	OM-O-004	Synthesis of benzofuropyridine analogues for potential oncologic drug applications	Reymark Ereje
16.15-16.30	OM-O-035	Cyanine/methotrexate nanoparticles for synergistic PDT/chemotherapy of breast cancer	Prapassara Muangsopa

OM - Organic Synthesis and Medicinal Chemistry (con't)

Saturday, 21 January 2023 (PACCON 3, E4A-609)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Tirayut Vilaivan; Co-Chair: Assoc. Prof. Dr. Kwanruthai Tadpetch			
09.00-09.30	OM-I-040	Syntheses of complex securinega alkaloids	Prof. Dr. Sunkyu Han
09.30-10.00	OM-I-052	Total synthesis of palodesangrens and lamellarins/azalamellarins	Dr. Poonsakdi Ploypradith
10.00-10.15	OM-O-014	Concise synthesis and confirmation of the absoloute configurations of naturally occurring bioactive 2,7'-cyclolignans	Nannaphat Chumsri
10.15-10.30	OM-O-017	Amphiphilic chitosan bearing double palmitoyl chains and quaternary ammonium moieties as a nanocarrier for plasmid DNA	Thev Pol
10.30-10.45	Coffee break		
Chair: Dr. Poonsakdi Ploypradith; Co-Chair: Prof. Dr. Tirayut Vilaivan			
10.45-11.15	OM-I-051	Copper makes the difference: Developing sustainable photoredeox catalyzed transformations	Prof. Dr. Oliver Reiser
11.15-11.30	OM-O-027	Syntheses of 3-aryl tetrahydroisoquinolines via an intermolecular [4+2] cycloaddition of sultines with imines	Dr.Aurapat Ngamnithiporn
11.30-11.45	OM-O-010	NaI mediated synthesis of 2-aminobenzimidazoles from o-phenylenediamines via electrochemical method	Khuyen Thu Nguyen
11.45-12.00	OM-O-023	Heavy atom effect on intersystem crossing in boron difluoride formazanate complex-based photosensitizers	Tunyawat Khrootkaew
12.00-13.00	Lunch		

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OM - Organic Synthesis and Medicinal Chemistry (con't)

Saturday, 21 January 2023 (PACCON 3, E4A-609)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Oliver Reiser; Co-Chair: Assoc. Prof. Dr. Kwanruthai Tadpetch			
13.00-13.30	OM-I-049	Green and biocompatibler reactions: From discovery to applications	Prof.Dr. Teck-Peng Loh
13.30-13.45	OM-O-012	Synthesis of pinostrobin hydrazone derivatives as a-glucosidase inhibitors	Thanh The Ngo
13.45-14.00	OM-O-011	Synthesis and a-glucosidase inhibition of usnic acid enamine 1,2,3-triazole sulfonamide derivatives	Pipatpon Raksapon
14.00-14.15	OM-O-013	Structural modification of tanshinone IIA and their a-glucosidase inhibitory activities	Mutita Kongphet
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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PC - Polymer Chemistry and Bio-based materials

Friday, 20 January 2023 (PACCON 6, E4A-616)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Paul Topham; Co-Chair: Asst. Prof. Dr. Patchara Punyamoonwongsa			
15.15-15.45	PC-I-060	Case studies in polymer innovation: stimuli responsive soft matter, high performance 3D printable materials and waste plastics initiatives	Prof. Dr. Hu Xiao
15.45-16.00	PC-O-002	Rapid assessment of wetting of natural fibers surfaces by biodegradable copolyester using spectroscopic and microscopic techniques	Dr. Jyoti Giri
16.00-16.15	PC-O-007	Structural analysis and characterization of imidazolium-based ionic liquids via molecular dynamics simulations	Mr. Michael Armstrong

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PC - Polymer Chemistry and Bio-based materials (con't)

Saturday, 21 January 2023
(PACCON 6, E4A-616)

Time	Code	Title	Presenter
Chair: Prof. Dr. Voravee Hoven; Co-Chair: Asst. Prof. Dr. Anyarat Watthanaphanit			
09.00-09.30	PC-I-036	The struggles of natural rubber as an eco-friendly industrial polymer	Prof. Dr. Jitladda Sakdapipanich
09.30-09.45	PC-O-012	The transparency of bio-based waterborne polyurethane film from natural rubber	Assoc. Prof. Dr. Nitinart Saetung
09.45-10.00	PC-O-019	Surface modification of biomass-derived cellulose nanofibers with succinic anhydride for biodegradable PLA/PBS/CNF nanocomposites: Gas barrier properties	Dr. Chuenkhwan Tipachan
10.00-10.15	PC-O-030	Effect of calendaring on properties of electrothermal actuators based on graphite composite	Ms. Sarawadee Thakasame
10.15-10.30	PC-O-005	Fabrication and characterization of chitosan/star-shaped polycaprolactone network structure via urea/urethane linkage	Ms. Pennapa Amonkol
10.30-10.45	Coffee break		
Chair: Prof. Dr. Voravee Hoven; Co-Chair: Asst. Prof. Dr. Chantiga Choochottiros			
10.45-11.15	PC-I-037	Delivery of therapeutic agents using biopolymers	Prof. Dr. Lisbeth Grondahl
11.15-11.30	PC-O-017	Electrospun PLA/MoS2 composite membranes for light-driven steam generation	Ms. Tharnthip Krasian
11.30-11.45	PC-O-026	Four-arms star-shaped poly (ε-caprolactone-co-poly(ethylene glycol) micelles: preparation using an organo-catalyst and characterization for use as drug carriers in chemotherapy	Ms. Wanwanut Chueasupcharoen
11.45-12.00	PC-O-016	Liposomes conjugated with poly (2-ethyl-2-oxazoline) as potential carriers for nucleic acid delivery	Mr. Pongsakorn Yuntasiri
12.00-13.00	Lunch		

PC - Polymer Chemistry and Bio-based materials (con't)

Saturday, 21 January 2023 (PACCON 6, E4A-616)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Paul Topham; Co-Chair: Asst. Prof. Dr. Patchara Punyamoonwongsa			
13.00-13.30	PC-I-055	Polymers and the eye - challenges and opportunities	Prof. Dr. Brian Tighe
13.30-14.00	PC-I-038	Responsive polymer conjugates for anticorrosion applications	Assoc. Prof. Dr. Daniel Crespy
14.00-14.15	PC-O-025	Optimization of formulation and process variables for PLGA nanoparticles preparation used in osteoarthritis drug delivery treatment	Ms. Paveena Tikakosol
14.15-14.30	PC-O-046	Effects of crosslinker concentration on the target properties of photopolymerized Na-AMPS hydrogels	Ms. Waewploy Sukmongkolwongs
14.30-14.45	PC-O-013	Development of electrospun fiber mat from silk fibroin for air pollution capturing	Ms. Papimol Mongyun
14.45-15.00	PC-O-027	Development of shape memory effect on a poly(L-lactide-co-glycolide-co-caprolactone) (PLGC) terpolymer using hexamethylene diisocyanate (HDI) as a crosslinker	Mr. Kittisak Yarungsee
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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PT - Physical and Theoretical Chemistry

Friday, 20 January 2023 (PACCON 8, E4A-708)			
Time	**Code**	**Title**	**Presenter**
Chair: Dr. Supawadee Namungruk; Co-Chair: Dr. Kaito Takahashi			
15.15-15.45	PT-I-039	Molecular design using modern machine learning methods	Prof. Dr. Deva Priyakumar
15.45-16.00	PT-O-018	A Perspective of graphene from electrochemical measurement to machine learning using artificial neural network	Dr. Pawin Iamprasertkun
16.00-16.15	PT-O-034	Data analysis of heteroatom-doped graphene supercapacitors	Dr. Kulpavee Jitapunkul
16.15-16.30	PT-O-023	Computational study of the glycolysis of poly(ethylene terephthalate) catalyzed by acid-base pairs in MOF-808-Zn metal−organic framework	Ms. Krongkwan Nilwanna

PT - Physical and Theoretical Chemistry (con't)

Saturday, 21 January 2023 (PACCON 8, E4A-708)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Deva Priyakumar Co-Chair: Prof. Dr. Siriporn Jungsuttiwong			
08.30-09.00	PT-I-033	Theoretical models for Pt-based catalysts	Prof. Dr. Alessandro Fortunelli
09.00-09.30	PT-I-001	Can we understand CO_2 electroreduction selectivity from electronic structure?	Dr. Kaito Takahashi
09.30-09.45	PT-O-009	Platinum particles supported on Boron-Nitride doped graphene ribbon as a catalyst for methanol oxidation in direct methanol fuel cell	Asst. Prof. Dr. Piti Treesukol
09.45-10.00	PT-O-013	A DFT Investigation on the mechanism of CO2 electrochemical reduction toward C2 Products on Cu-based catalysts: Effects of explicit solvent, structure and composition on C2 product selectivity	Ms. Jirapat Santatiwongchai
10.00-10.15	PT-O-006	Computational design and investigation of zirconium-porphyrin-based metal-organic frameworks (MOFs) for photocatalytic CO2 reduction	Dr. Sarawoot Impeng
10.30-10.45	Coffee break		
Chair: Prof. Dr. Yasuteru Shigeta Co-Chair: Prof. Dr. Siriporn Jungsuttiwong			
10.45-11.15	PT-I-005	Bipolar electrochemistry: the renaissance of a physico-chemical concept	Prof. Dr. Alexander Kuhn
11.15-11.30	PT-O-026	Catalytic roles of V and Ni on hydrogen desorption and diffusion kinetics of Mg-based hydrides for hydrogen storage materials: A computational study	Dr. Patcharaporn Khajondetchairit
11.30-11.45	PT-O-024	Ethanol dehydrogenation to acetaldehyde over isolated metal sites grafted onto dealuminated beta zeolite: A density functional theory study	Mr. Wachira Jeevapong
12.00-13.00	Lunch		

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PT - Physical and Theoretical Chemistry (con't)

Saturday, 21 January 2023 (PACCON 8, E4A-708)			
Time	**Code**	**Title**	**Presenter**
Chair: Prof. Dr. Hidehiro Sakurai Co-Chair: Dr. Patcharanan Choto			
13.00-13.30	PT-I-049	Integrating the innovative research for producing biogreen diesel over bifunctional metal phosphide catalysts	Dr. Pongtanawat Khemthong
13.30-14.00	PT-I-036	Sustainable management of water by photocatalytic degradation of toxic pollutants under natural solar light	Assoc. Prof. Dr. Suwat Nanan
14.00-14.15	PT-O-038	Physiochemical properties of activated carbons from gamma and electron beam-irradiated biomass	Ms. Phonpimon Numee
14.15-14.30	PT-O-041	A DFT study on a single transition metal doped C3N for CO oxidation reaction	Ms. Suparada Kamchompoo
15.00-15.15	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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PT - Physical and Theoretical Chemistry (con't)

Saturday, 21 January 2023
(PACCON 9, E4A-709)

Time	Code	Title	Presenter
Chair: Assoc. Prof. Dr. Suwat Nanan; Co-Chair: Assoc. Prof. Phornphimon Maitarad			
08.30-09.00	PT-I-040	Buckybowl chemistry: Interplay of experiments and theory	Prof. Dr. Hidehiro Sakurai
09.00-09.30	PT-I-002	Theoretical analysis on 3D domain swapping artificial proteins	Prof. Dr. Yasuteru Shigeta
09.30-09.45	PT-O-007	Molecular dynamic simulation of carnostatine, homocarnosine and ophidine bind human carnosinase enzyme (CN1)	Mr. Borvornwat Toviwek
09.45-10.00	PT-O-008	Investigation of stability of cys-modified hemolysin nanopores fo nanopore-base sensing technology	Mr. Nattapon Kuntip
10.00-10.15	PT-O-019	Furopyridine and quinoxalinone scaffolds as novel EGFR tyrosine kinase inhibitors: In silico and in vitro elucidation	Assoc. Prof. Dr. Thanyada Rungrotmongkol
10.30-10.45	Coffee break		
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (Main Auditorium: C4)		
16.30-17.30	Closing Ceremony (Main Auditorium: C4)		

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Workshop & Lunch talk

Workshop I: Tri Solution Co., Ltd Friday, 20 January 2023 (PACCON 11 E4A-715)	
Time	**Schedule**
13.00-15.00	Demo CPC-PLC Unit for purification natural and canabis products

Workshop II: Bara Scientific Co., Ltd. Friday, 20 January 2023 (PACCON 14, E4A-718)	
Time	**Schedule**
13.00-15.00	The preparation, extraction and analysis of medicinal cannabis industry

Lunch Talk: SciSpec Co., Ltd. Saturday, 21 January 2023 (PACCON 2, E4A-608)	
Time	**Schedule**
12.00-13.00	Structural Elucidation for research into metabolism, metabolomics, forensics, natural products, impurities, and degradants

Meet and greet with Nobel Laureate and launching of TYCN at PACCON 2023

Saturday, 21 January 2023 (Pradoo Dang Conference Meeting Room 2, E4 Building)	
Time	**Schedule**
09:30-10:00	TYCN official launch - Speech from Chemical Society of Thailand (CST) - Speech from IYCN Presentation of the Merck-CST-TYCN award
10:00–10:30	Merck-CST-TYCN for Sustainable Future Award Talk (20 mins, 10 mins Q&A)
10:30–10.45	Coffee break and Networking
10.45-11.30	TYCN symposium: Rapid-fire talks (3 mins talk, 8 speakers)
11:30–12:00	Networking
12:00–13:00	Lunch
13:00–14:30	Meet and greet with Nobel Laureate and distinguished chemists (Panel discussion: Sir David MacMillan (Princeton University), Prof. Dr. Tirayut Vilaivan (Chulalongkorn University), Prof. Dr. Pimchai Chaiyen (VISTEC), Dr. Poonsakdi Ploypradith (Chulabhorn Research Institute), moderators (TYCN). Interview and Q&A from audience (online/on-site)
14:30–15:15	Break and networking
15:15–16:30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (E4 Pradoo Dang Conference 1&2)
16.30-17.30	Closing Ceremony (E4 Pradoo Dang Conference 1&2)

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Small-scale Chemistry Demonstration

Saturday, 21 January 2023 (E4A-518)	
Time	**Schedule**
09.00-9.30	Invited Speaker: Mr. Robert Worley, CLEAPPS, UK. Title: Using small-scale chemistry to uncover information for teachers and students about how "simple" chemical processes used in schools, operate. However, there are barriers in the way
09.30-10.30	Networking activities
10:30–10.45	Coffee break and Networking
10.45-11.30	Networking activities
11.30-12.30	Small-scale Chemistry Demonstration (M-Square, E-Park Building; Second Floor)
12:00–13:00	Lunch
13.30-15.00	Networking activities
15.00-15.15	Coffee break
15.15-16.30	Plenary Speaker: Prof. Dr. David W.C. MacMillan (E4 Pradoo Dang Conference 1&2)
16.30-17.30	Closing Ceremony (E4 Pradoo Dang Conference 1&2)

LIST OF PRESENTATION

List of Titles and Authors for Oral Presentation

AC - Analytical Chemistry

AC-O-002 Electrochemical detection of creatinine via copper-creatinine complex formation: Computational and experimental studies
Kamonwad Ngamchuea[1], Suttipong Wannapaiboon[2], Papawit Nongkhunsan[2], Pussana Hirunsit[3], and Ittipon Fongkaew[3]

AC-O-024 Cu-Pd bimetallic nanoparticles modified screen-printed graphene electrode for selective determination of oxalic acid based on molecularly imprinted polymer
Anurak Weingkum[1], and Janjira Panchompoo[1]

AC-O-028 Carbon Dots in Highly Sensitive and Selective Capsaicin and 17β-Estradiol Electrochemical Sensors
Preeyanuch Supchocksoonthorn[1], Nichaphat Thongsai[1], Wei Wei[2], Padma Gopalan[2], Ma Concepcion Alvior Sinoy[3], Mark Daniel G. de Luna[3], and Peerasak Paoprasert[3]

AC-O-034 Optimization of Enrofloxacin (ENR) and Ciprofloxacin (CIP) in Fish Samples by High-Performance Liquid Chromatography coupled with Fluorescence Detector (HPLC-FLD) by using Tetracycline (TC) as Internal Standard
Mr. Dyveasna Nath[1]

AC-O-043 The invention of platinum-gold nanoparticle@carbon dot-graphene oxide in chitosan scaffold for prostate immunosensor
Suphaporn Chenkhurthum[1], Anchana Preechaworapun[2], Pusit Pookmanee[3], and Tanin Tangkuaram[3]

AC-O-047 Toward personal home health-care kidney biomarker urinalysis
Waswan Prempinij[1], Wipa Suginta[1], and Albert Schulte[1]

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AC - Analytical Chemistry *(con't)*

AC-O-051

Use of an Ag/AgCl electrode couple as a conductometric probe of glucose oxidase activity

Kawin Loha[1], Thitikorn Boonkoom[2], Deanpen Japrung[2], and Albert Schulte[2]

AC-O-057

The development of nitrogen-doped carbon dots/ Ni-MnFe-layered double hydroxides (N-CDS/ Ni-MnFe-LDHs) as immunoassay label for low-density lipoprotein detection

Akarapong Prakobkij[1], Purim Jarujamrus[1], Suticha Chunta[2], Runglawan Chawengkittikul[3], Tinnagon Keawin[3], Nutthaporn Malahom[3], Suparb Tamuang[3], Maliwan Amatathongchai[3], and Daniel Citterio[4]

AC-O-058

Nitrogen-doped graphene quantum dots (N-GQDs) as fluorescent paper-based test kit for selective and sensitive cyanide in food monitoring

Nutthaporn Malahom[1], Trirat Ma-In[1], Puttaraksa Naksen[1], Wipark Anutrasakda[2], Maliwan Amatatongchai[2], Daniel Citterio[3], and Purim Jarujamrus[3]

AC-O-059

A novel spirooxazine derivative as a colorimetric probe for Fe(II) and Pb(II) determination in water samples based on a microfluidic paper-based analytical device (μPAD) for maintaining photochromic efficiency

Nattasa[1], Niyada Khunkhong[1], Yutthana Wongnongwa[2], Siriporn Jungsuttiwong[2], Tinnagon Keawin[2], Vinich Promarak[3], Phattananawee Nalaoh[3], Khomson Suttisintong[4], Kantapat Chansaenpak[4], and Purim Jarujamrus[4]

AC - Analytical Chemistry *(con't)*

AC-O-063 A novel fluorometric paper-based sensor for sensitive determination of Cd(II) in water and herbal medicine samples by using nitrogen-doped graphene quantum dots

Puttaraksa Naksen[1], Siwaluck Boonruang[2], Nunthawan Yuenyong[3], Hooi Ling Lee[4], Pravena Ramachandran[4], Wipark Anutrasakda[5], Maliwan Amatatongchai[5], Somkid Pencharee[6], and Purim Jarujamrus[6]

AC-O-072 Carbon nanotube-modified graphene sensor for voltammetric detection of 2,4,6-trinitrotoluene explosive and a drone sampling method

Paithoon Prasertying[1], Nattanun Suvaporn[1], Chompoonut Keawmamuang[2], Supatana Buking[2], Prapin Wilairat[2], and Duangjai Nacapricha[2]

AC-O-075 Electrochemical detection in gas phase for direct determination of sulfite residue in frozen shrimp

Nanthatchaphon - Jantawong[1], Paithoon Prasertying[1], Thinnapong Wongpakdee[1], Nuttamon Khoonrueng[1], Purita Aroonchat[1], Nutnaree Fukana[1], Prapin Wilairat[1], Kanchana Uraisin[1], and Duangjai Nacapricha[1]

AC-O-076 Cost-effective long-path absorption liquid core waveguide with a gas diffusion flow analysis system for ammonium determination

Wasin Somboot[1], Jaroon Jakmunee[1], and Tinakorn Kanyanee[1]

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CC - Catalytic Chemistry

CC-O-005 A density functional theory study on how external oxygen enhances the Fe2O3 catalyst stability during hydrogen sulfide removal process

Sorawee Setasuban[1]

CC-O-006 Ce-based catalyst for DMC synthesis by indirect-urea a lcoholysis route

Thanapat Wattanaserarat[1], and Pattaraporn Kim[1]

CC-O-008 Diesters from ring opening of epoxides and acid anhydrides using chromium-salen binary system

Neen Phan-udom[1], and Khamphee Phomphrai[1]

CC-O-009 Production of hierarchical Faujasite from waste sand as adsorbent for Methylene blue dye removal

Krissanapat Yomthong[1], Watinee Nunthakitgoson[1], Anittha Prasertsab[1], Saros Salakhum[1], Anawat Thivasasith[1], Sunisa Watcharasing[2], Prapoj Kiattikomol[2], and Chularat Wattanakit[2]

CC-O-010 In-situ hydrogenation of furfural to tetrahydrofurfuryl alcohol over monometallic catalyst supported on hierarchical MFI zeolite

Anittha Prasertsab[1], Saros Salakhum[1], Peerapol Pornsetmetakul[1], Narasiri Maineawklang[1], and Chularat Wattanakit[1]

CC-O-011 Polymer coated Cu for electrocatalytic CO 2 reduction to C2 Products

Emut Sukma Sejati[1], Shu Han Hsu[1], Pongkarn Chakthranont[2], and Bunyarat Rungtaweevoranit[2]

CC - Catalytic Chemistry *(con't)*

CC-O-020 Low C-C coupling barrier for ethanol synthesis on non-metal doped graphyne driven by bond order conservation and flexible orbital hybridization

Poobodin Mano[1], Supawadee Namuangruk[1], and Kaito Takahashi[2]

CC-O-021 Effect of alkali treatment time on structural modification of commercial and synthesized ZSM-5 zeolites for use as cracking and reforming catalyst

Suttipong Singhyakaew[1], and Nongnuch Rueangjitt[1]

CC-O-025 Effect of calcium-modified mixed metal oxide supported nickel catalyst in dry reforming reaction

Orrakanya Phichairatanaphong[1], Dr. Nevzat Yigit[2], Thomas Wicht[2], Professor Günther Rupprechter[2], Professor Metta Chareonpanich[2], and Asst.Prof.Dr. Waleeporn Donphai[2]

CC-O-027 Preparation and Characterization of Sulfated CaO Catalyst for Biodiesel Production

Chatchawin Dulyamahakamtorn[1], Saowapa Chotisuwan[1], and Rattana Jariyaboon[1]

CC-O-028 Electrocatalytic reduction of carbon dioxide on SnO2 nanorods to formate

Nuttapong[1]

CC-O-030 Hydrodeoxygenation of Fatty Acid Methyl Esters (FAMEs) over Cupper Phyllosilicate Catalysts (CuPS)

Warot Prasanseang[1], Tawan Sooknio[2], and Kittisak Choojun[2]

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CC - Catalytic Chemistry *(con't)*

CC-O-031 Magnetic mesoporous carbon acid catalysts prepared via facile self-assembly method and their use in conversion of xylose into furfural

Piyamit[1], Warucha Appahad[2], Sureeporn Saknaphawuth[2], Boontida Pongthawornsakun[2], Joongjai Panpranot[2], and Laemthong Chuenchom[2]

CC-O-033 Polymer-based catalytic systems from click reactions: Towards sustainable chemical reactions

Preeyanuch Sangtrirutnugul[1], Vasut[2], Siraprapa Somsri[2], and Attawit Jehdaramarn[2]

CC-O-038 Catalytic activity of gold nanoparticles deposited on citric acid-modified surface-fibrillated cellulose

Butsaratip Suwattananuruk[1], Yuta Uetake[2], and Hidehiro Sakurai[3]

CC-O-039 Catalytic transfer hydrogenation of furfuryl alcohol to gamma-Valerolactone by using Y zeolites and Cu/Y catalysts

Thanisorn Rattanapornchaiwat[1], Tanyarat Shoosri[1], Tawan Sooknoi[1], and Patcharaporn Weerachawanasak[1]

CE - Chemical Education

CE-O-001 The chemistry link: Enhancing school children's chemistry interest via university experience
Assoc.Prof.Dr. Rizafizah Binti Othaman[1]

CE-O-015 A Kinetic experiment of "breathalyzer" reaction using smartphone
Punnatron Kongsithiseth[1], and Saowarux Fuangswasdi[1]

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EE - Environmental Chemistry and Renewable Energy

EE-O-002

Fluorometric chemosensor based on excited-state intramolecular proton-transfer (ESIPT) characteristic for ultrasensitive detection of Cu2+ ion in aqueous media and its application in environmental monitoring and bioimaging

Pornthip Piyanuch[1], and Kantapat Chansaenpak[1]

EE-O-009

Atomically dispersed crystalline cobalt tungstate/amorphous cobalt boride heterostructure and nitrogen-codoped multiwalled carbon nanotube@reduced graphene oxide nanoribbon toward catalysis of oxygen reduction

theerawat dudngam[1], Panitat Hasin[1], and Gasidit Panomsuwan[2]

EE-O-010

Platinum and PtNi nanoparticle-supported multiwalled carbon nanotube electrocatalysts prepared by one-pot p yrolytic synthesis with an ionic liquid for dye-sensitized solar cells

Thunyathron Sanjailuk[1], Kai Pan[2], and Panitat Hasin[2]

EE-O-014

Direct Synthesis of Liquefied Petroleum Gas from Carbon Dioxide over Bifunctional Catalyst, CuZnAl/Various Zeolite Types Supporting Tandem Reaction

Chiraphat Kumpidet[1], Angkana Khuenpetch[1], Sarannuch Yangyuen[1], Rujira Jitrwung[1], Jiraporn Chalorngtham[1], Kuntima Krekkeitsakul[1], Anantachai Wannajampa[1], and Hiran Jinda[1]

EE-O-017

Preparation of porous MIL-53(Fe)-loaded Cellulose/HPMC aerogels as an efficient Arsenic removal adsorbent

Fikri Haikal[1], and Fuangfa Unob[1]

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EE-O-028 Filter paper-based nanoplastics detection using surface-enhanced Raman scattering

MARY JANE D. BALANI[1], PROMPONG PIENPINIJTHAM[2], and SANONG EKGASIT[3]

EE-O-034 Development of cobalt-based structured catalyst for production of green diesel by Fischer-Trospch synthesis

Pronprom Aurud[1], Atthapon Srifa[1], Wanida Kooamornpattana[1], Suttichai Assabumrungrat[2], Suwimol Wongsakulphasatch[3], and Sakhon Ratchahat[3]

EE-O-035 The production of green diesel by Fischer-Trospch synthesis over cobalt-based catalysts supported on various carriers

Sreypov Ke[1], Atthapon Srifa[1], Wanida Kooamornpattana[1], Sutthichai Assabumrungrat[2], Suwimol Wongsakulphasatch[3], and Sakhon Ratchahat[3]

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FA - Food and Agricultural Chemistry

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Discrimination of weedy rice using near infrared spectroscopy (NIR) and hyperspectral NIR image combined with modified self-organizing maps (SOMs)

Sureerat Makmuang[1], Sanong Ekgasit[1], and Kanet Wongravee[1]

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Nattiya Laiwattanapaisarn[1], Jiraya Kiriratnikom[1], Kwanchanok Udomsasporn[1], Tanyawan Pongpanit[1], and Khamphee Phomphrai[1]

IC-O-009 Titanium complexes of phenoxy-azo and phenoxy-imine ligands: a comparative study for the ring-opening polymerization of rac–lactide and ε–caprolactone
Wasan Joopor[1], and Pimpa Hormnirun[1]

IC-O-010 Synthesis and characterization of aluminum enolate complexes for the ring-opening (co)polymerization of rac-Lactide, ε-caprolactone and ε-decalactone
Sirawan Kamavichanurat[1], Kunanon Jampakaew[1], and Pimpa Hormnirun[1]

IC-O-011 Nanosilica derived from biomass power plant bottom ash
Natchaya Atibaedya[1]

IC-O-014 Adsorption–desorption of potassium ion on rice husk ash
Pimchanok Phatho[1], Khamphe Phoungthong[2], and Thitipone Suwunwong[2]

IC-O-019 Controlled Ring-Opening Polymerization of Macrolactones: A Pursuit of Active Aluminum-Based Catalysts
Chutikan Nakornkhet[1], Tanin Nanok[1], and Pimpa Hormnirun[1]

IC-O-020 Multifunctional bis-BODIPY linked-triazole chemosensors
Worakrit Saiyasombat[1], and Supavadee Kiatisevi[1]

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IC - Inorganic Chemistry *(con't)*

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Raul Diaz Torres[1], Taradon Piromchart[2], and Kittipong Chainok[2]

IE - Industrial and Engineering Chemistry

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IE-O-004 Biogas production enhancement in anaerobic batch bioreactor from Napier grass using magnetite particles
Ting-Wu KO[1], Prakaidao POMDAENG[2], Shih-Yun CHANG[2], and Chen-Yeon Chu[2]

IE-O-005 High purity silver microstructure recovered form silver wastes with controllable shape by using polymeric stabilizer
Natsuda Muankhajorn[1], Sanong Ekgasit[2], and Kanet Wongravee[2]

IE-O-007 Titanium dioxide nanoparticles on porous carbon media for azo-dye wastewater treatment
Saitharn Limsakul[1], Yothin Chimupala[1], Chanchana Thanachayanont[2], and Adisak Siyasukh[2]

IE-O-010 Catalyst Derived from Spent Coffee Grounds for Azo Dye Degradation
Manunchaya Jaideekard[1], Adisak Siyasukh[2], Yothin Chimupala[2], and Chalita Ratanatawanate[3]

IE-O-011 Synthesis of activated carbon from turmeric waste by using microwave
Siraporn Zumsiri[1]

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Apitsada[1], Pongtorn[2], Suttichai[3], Amornchai[4], Nuttha[5], and Apinan[6]

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MN-O-001 Enantioselective synthesis of chiral compounds on chiral encoded mesoporous copper surfaces

Mr. Banyong Suwankaisorn[1], Asst. Prof. Dr. Chularat Wattanakit[1], and Prof. Dr. Alexander Kuhn[2]

MN-O-011 Co-decorated Lignin-based Carbon Nanofibers as Binder-Free Electrode Materials for Supercapacitor

Thanigan Nakkhong[1], Autchara Pangon[2], and Thitirat Inprasit[2]

MN-O-014 Formulation, characterization and in vitro evaluation of vitamin-loaded nanoparticle

Siriratchakorn Sathiensathaporn[1], and Kanlaya Katewongsa[1]

MN-O-015 Hydrazide naphthalimide functionalized spherical silica nanoparticles for detection of aromatic aldehyde

Sukprasert Sararit[1], and Boosayarat Tomapatanaget[1]

MN-O-016 Improving thermostability of bromelain via immobilization onto clay–carboxymethylcellulose composites for aquafeed application

Kanlayanit[1]

MN-O-017 Ag/AgO nanoparticles embedded electrospun natural rubber/polyacrylonitrile-based carbon nanofibers for tunable antibacterial activity

Songwuit Chanthee[1], Jenjira Jirasangthong[1], Channarong Asavatesanupap[2], and Malee Santikunaporn[2]

MN-O-029 Reveal the dynamic Solid Electrolyte Interphase formation of Li-based Water-in-Salt Electrolyte under optical observation

Rossukon Jommongkol[1], Siraprapha Deebansok[2], and Olivier Fontaine[3]

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Jatsadakron Chatsen[1]

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Pongpichet Srikritsadawong[1], Saranya Phunpruch[1], Panumart Thongyoo[2], and Nathawut Choengchan[2]

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Pattanasak Tipparak[1], and Duangmanee Wongratanaphisan[2]

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Siraprapha Deebansok[1], and Olivier Fontaine[2]

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NP - Natural Products, Biological Chemistry and Chemical Biology

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Styryl lactone derivatives and aristolactam alkaloids from Goniothalamus tapis Miq. and their α- glucosidase inhibitory activity

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Passakorn Teerapongpisan[1], Virayu Suthiphasilp[2], Tharakorn Maneerat[3], Thidarat Duangyod[4], Rawiwan Charoensup[5], Brian O Patrick[6], Raymond J. Andersen[6], and Surat Laphookhieo[7]

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Wuttichai Jaidee[1], Narawadee Rujanapun[1], Thidarat Duangyod[2], Tharakorn Maneerat[3], Surat Laphookhieo[3], Kulawadee Kumpeera[3], and Rawiwan Charoensup[3]

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Dan-Dan Yang[1], Prasat Kittakoop[2], Tawatchai Thongkongkaew[2], and Sanya Sureram[2]

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Apisara[1], Kwanjai[2], Boonyanoot[3], Jantana[4], and Somdej[4]

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Tadsanee Awang[1], and prapasiri pongprayoon[1]

NP - Natural Products, Biological Chemistry and Chemical Biology *(con't)*

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Purin Sathirathai[1], Kidakarn Palakarn[1], Wutthiphat Nakano[1], and Pisanu Toochinda[1]

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Pongsakorn Yuntasiri[1], and Voravee P. Hoven[1]

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Tharnthip Krasian[1], Winita Punyodom[1], Kiattikhun Manokruang[1], and Patnarin Worajittiphon[1]

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Paveena Tikakosol[1], Donraporn Daranarong[2], Jutamas Kongsuk[3], Montira Sriyai[3], Robert Molloy[4], and Winita Punyodom[5]

PC-O-026

Four-arms Star-shaped Poly(ε-caprolactone-co-poly(ethylene glycol) Micelles: Preparation Using an Organo-catalyst and Characterization for use as Drug Carriers in Chemotherapy

Wanwanut Chueasupcharoen[1], Jutamas Kongsuk[2], Montira Sriyai[2], Donraporn Daranarong[3], Puttinan Meepowpan[4], Kiattikhun Manokruang[4], Chadarat Ampasavate[5], Robert Molloy[6], and Winita Punyodom[6]

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Kittisak Yarungsee[1], Amataporn Jompralak[1], Montira Sriyai[2], Jutamas Kongsuk[2], Kiattikhun Manokruang[3], Chawan Manaspon[4], and Winita Punyodom[5]

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PC-O-030

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Sarawadee Thakasame[1], Supranee Kaewpirom[1], and Siridech Boonsang[2]

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Waewploy Sukmongkolwongs[1], Amlika Rungrod[1], Robert Molloy[2], Winita Punyodom[2], Brian J Tighe[3], Anisa Mahomed[3], and Runglawan Somsunan[3]

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PT-O-009 Platinum particles supported on Boron-Nitride doped graphene ribbon as a catalyst for methanol oxidation in direct methanol fuel cell

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PT-O-018 A Perspective of Graphene from Electrochemical Measurement to Machine Learning using Artificial Neural Network

Pawin Iamprasertkun[1]

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PT-O-019 Furopyridine and quinoxalinone scaffolds as novel EGFR tyrosine kinase inhibitors: in silico and in vitro elucidation

Duangjai Todsaporn[1], Utid Suriya[2], Panupong Mahalapbutr[3], Athina Geronikaki[4], Kiattawee Choowongkomon[5], and Thanyada Rungrotmongkol1[6]

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Wachira Jeevapong[1]

PT-O-026 Catalytic Roles of V and Ni on Hydrogen Desorption and Diffusion Kinetics of Mg-Based Hydrides for Hydrogen Storage materials: A computational study

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PT-O-038 Physiochemical Properties of Activated Carbons from Gamma and Electron beam-Irradiated Biomass

Kotchaphan Kanjana[1], Tanagorn Kwamman[2], and Phonpimon Numee[2]

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PT - Physical and Theoretical Chemistry *(con't)*

PT-O-041

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Surinya Traipop[1], Sakda Jampasa[1], Pisit Tangkijvanich[2], Natthaya Chuaypen[2], and Orawon Chailapakul[2]

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Piyawan Phansi[1], Teetawat Somboonchai[1], Paradorn Ngamdee[1], Rittirut Ketrumphun[2], and Duangjai Nacapricha[3]

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AC - Analytical Chemistry *(con't)*

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Sarawut Somnam[1], Prathan Comejina[1], Miki Kanna[1], and Suttida Luangton[1]

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Natee Lerdpiriyaskulkij[1], Kanya Mongkolpoch[1], Supat Banyen[2], Arjnarong Mathaweesansurn[3], and Ekarat Detsri[4]

AC-P-015 Halloysite-based nanocomposites for photocatalytic d egradation of organic dyes

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AC-P-016 The development of gel-based electrolyte for the simultaneous determination of Cd(II) and Pb(II)

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Praewpitcha Poowattnapong[1], Wilai Siriwatcharapiboon[1], and Chaiya Prasitticai[1]

AC-P-021 Luffa Cylindrica as natural SPE sorbent for simultaneous determination of Estrone 17-β- estradiol, and Testosterone in aquaculture farm

Deki[1], Prisna Pianjing[2], Proespichaya Kanatharana[2], Panote Thavarungkul[2], and Chongdee Thammakhet-Buranachai[2]

AC-P-022 Development of a poly(o-phenylenediamine) coated aluminum garter spring micro-solid phase extractor for the analysis of pyrethroids in fresh chili samples

Kednipa Lumlong[1], Charinrat Siritham[2], Proespichaya Kanatharana[2], Panote Thavarungkul[2], and Chongdee Thammakhet-Buranachai[2]

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AC-P-023 In-tip monolithic μ-SPE coupled with LC-MS/MS for the analysis of serotonin in human urine samples

Kesara Ar-sanork[1], Ati Chetsurakul[1], Apiwat Muekhunthod[1], and Patcharin Chaisuwan[1]

AC-P-025 Direct current conductivity detection for sulfite determination in gas diffusion flow injection analysis system

Apisith Phujeenaphun[1], Wasin somboot[1], Jaroon Jakmunee[1], and Tinakorn Kanyanee[1]

AC-P-026 The treatment of green and navy blue reactive dyes by photolysis and photooxidation processes using a homemade UV reactor

Orawan Kritsunankul[1]

AC-P-027 Dopamine biosensor based on immobilization of tyrosinase incorporated carbon dot on a screen-printed electrode

Tanin Tangkuaram[1], Anchana Preechaworapun[2], and Tik Ouiram[3]

AC-P-029 Graphene quantum dots and its molecularly imprinted polymer as a sensing probe for creatinine detection

Thitima Thatujirangkul[1], Pimpanitpa Kunthadong[1], Pakit Kumboonma[1], Thidarat Kunawong[1], and Nutthaya Butwong[1]

AC-P-030 The development of an in-house method for quantitative analysis of available phosphorus in fertilizer based on the official method of AOAC (Method 960.03)

Soonthorn Khwan-On[1], Phusadee Muhamud[1], and Natchayata Muakthong[1]

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AC-P-031 Preparation of Ion Selective Membrane and Electrode Using Cobalt Porphyrin as Ionophore for Anion Detection

กวิสรา หลงศักปรีชา[1], and ธวัชชัย ต้นทุลานิ[1]

AC-P-032 Flow injection amperometric sensor for glutathione (GSH) detection based on rGO-COOH modified screen-printed carbon electrode

Thanawath Tuntiwongmetee[1], Suntisak Khumngern[1], Natha Nontipichet[1], Apon Numnuam[1], Panote Thavarungkul[1], and Proespichaya Kanatharana[1]

AC-P-033 Red cabbage as a green reagent for Pb(II) colorimetric determination

Supunnee Duangthong[1]

AC-P-035 Study of Bioactive Compounds Extracted from Native Rice Varieties in Southern Border Provinces, Thailand

ตฤณ ขาวสังข์[1], ผศ.ดร.จรีรัตน์ รวมเจริญ[2], ผศ.ดร.วีรยา คุ้มเมือง[2], ผศ.ดร.ปฐมารัตน์ รัตนช่วย[2], and นายเกียรติปริญญา อุ้นแจ้ง[2]

AC-P-036 Fabrication of antiviral COVID-19 favipiravir sensor based on Co3O4-Cu2O@MnO2 modified glassy carbon electrode

Nuenghathai Chaiya[1], Anchana Preechaworapun[2], Phetlada Kunthadee[3], and Tanin Tangkuaram[3]

AC-P-037 A graphene oxide amplified chemiluminescence flow injection procedure for the quantification of glutathione in cosmetics

Sakchai Satienperakul[1], Nonthawan Chalaprasert[1], Manoch Thanomwat[1], and Jiraporn Kitikul[1]

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AC-P-038 Chromatographic resolution of D/L-phenylglycine using modified silica with chiral selector

Kewalee Taepakdee[1], Varaporn Paradamit[1], Piyapat Laiyangkoor[2], and Punlop Kuntiyong[2]

AC-P-039 An optosensing probe based on quantum dots and molecularly imprinted polymer for the sensitive and selective determination of sparfloxacin

Nutnicha[1], Ratirat[1], and Opas[1]

AC-P-040 An optosensor based on nanocomposite sensing probe of quantum dots embedded in molecularly imprinted polymer for ultrasensitive detection of antibiotic

Jutarat[1], Nutnicha[1], and Opas[1]

AC-P-041 Determination of acrylamide in potato chips by gas chromatography-mass spectrometry

Chookiat Khongsiri[1], Aksarin Iamroeksiri[1], Anuwat Ratsamisomsi[2], and Warawut Tiyapongpattana[2]

AC-P-042 Separation of phenols by gas chromatography using three derivatized cyclodextrins as stationary phases

Tarika Lomcharoenwong[1], and Aroonsiri Shitangkoon[2]

AC-P-044 A spreadsheet based simulation approach to support learning of optimization process in gas chromatography

Nattawat Thanasarnchokephiboon[1], and Chadin Kulsing[1]

AC-P-045 Colorimetric Ammonia Determination by Using Anthocyanins Extracted from Agricultural Products

Wimwipha Duangphom[1], Wanida Bunhom[1], and Nattawadee Wisitruangsakul[1]

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AC-P-046 Colorimetric paper-based device coated with deep eutectic solvent for chromium(VI) detection

Fakhry Gripaldi[1], Apichat Imyim[1], and Nakara Bhawawet[1]

AC-P-048 Pencil lead disk electrodes with carbon nanotube-gelatin/ glucose oxidase modification: sustainable and economical glucose biosensors for common laboratory tasks

Kamonwan Chatree[1], and Albert Schulte[1]

AC-P-049 4-nitrophenol electroanalysis with carbon nanotube-modified pencil lead electrodes

Chotika Nhaemchei[1], Wipa Suginta[1], and Albert Schulte[1]

AC-P-050 Temperature dependence on separation efficiency of open tubular capillary ion chromatography for alkali/alkaline earth cations separation

Watcharapoln Harnmontree[1], Jaroon Jakmunee[2], and Tinakorn Kanyanee[2]

AC-P-052 Ion-association Liquid-liquid Extraction with Fluorescence Detection for Determination of Tetracycline hydrochloride

Patcharin nantaphan[1], and Saiphon Chanpaka[1]

AC-P-053 Carbon-based materials modified screen-printed electrode as a facile and sensitive electrochemical sensor for determination of paraquat

Jaroon Jakmunee[1], Jamras Lerdsri[2], and Jantima Upan[3]

AC-P-055 Electrochemical sensor based on nickel hydroxide decorated carbon nanotubes and mesoporous carbon modified screen-printed electrode for carbofuran detection

Jittrapun Soongsong[1], Suwaphid Themsirimongkon[2], Surin Saipanya[2], Kontad Ounnunkad[2], and Jaroon Jakmunee[2]

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AC-P-060

A stir bar sorptive extraction coupled with gas chromatography flame ionization detector for the determination of abused prescription drugs in lean cocktail samples

Kamonwan Nualdee[1], Ratchaneekorn Buain[1], Benjamas Janchawee[1], Warakorn Sukree[2], Chongdee Thammakhet-Buranachai[2], Proespichaya Kanatharana[3], Korbua Chaisiwamongkhol[4], Sathaporn Prutipanlai[4], and Apichai Phonchai[4]

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Spectrophotometric method for determination of tramadol hydrochloride in medicinal illegal products: Application to counterfeit study

Orawanya Sangkaew[1], Kamonchanok Ruangsri[1], Korbua Chaisiwamongkhol[2], and Apichai Phonchai[3]

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Polyaniline/Cellulose Nanofiber/Polyvinyl Alcohol Hydrogel-Modified Screen-Printed Electrode for Heavy Metals Detection

Pichapon Boonkrong[1], Nadtinan Promphet[2], Nadnudda Rodthongkum[2], and Pumidech Puthongkham[2]

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Development of a sequential injection analysis system with spectrophotometric detection for the determination of iron in rice sample

Pornpailin[1], Kanchana[1], Thitirat[2], and Phoonthawee[2]

AC-P-065

Nickel Oxide Nanoparticles Modified Screen-printed Carbon Electrode for 5- Hydroxymethylfurfural Determination

Supada Khonyoung[1], Jantima Upan[2], Pijika Mool-am-kha[3], Jamras Lerdsri[4], Jaroon Jakmunee[5], and Preeyaporn Reanpang[6]

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AC-P-067 Evaluation of Spectrophotometric Methods for Determination Ethylenediaminetetraacetic Acid by Sequential Injection Analysis

Wipawee Chayman[1], Pornpailin Jinda[1], and Kanchana Uraisin[1]

AC-P-068 Study of Copper Metal-Organic Frameworks as an Electrochemical Sensor for Analysis of Glutathione

Anawin Promkaew[1], Paithoon Prasertying[1], Nathakrit Trianreal[1], Jonggol Tantirungrotechai[1], Duangjai Nacapricha[1], and Kanchana Uraisin[1]

AC-P-069 Gold-leaf electrochemical sensor for the determination of ascorbic acid in vitamin C tablet

Kurnia Hidayatulloh Alqibthiyah[1], Nanthatchaphon Jantawong[1], Paithoon Prasertying[1], and Duangjai Nacapricha[1]

AC-P-070 Application of an immunosensor for the determination of AFB1 in real samples

Chulalak Damphathik[1], Jamras Lerdsri[2], Jaroon Jakmunee[3], and Anchalee Samphao[3]

AC-P-071 Novel micro flow-through cell for determination of phosphate in natural water

Natthaya Siangdee[1], Suwimon Chaohuaimak[1], and Napaporn Youngvises[1]

AC-P-073 Dispersive liquid-liquid microextraction for quantitation of organophosphate pesticides in fruit juice using gas chromatography

Andaman Thomthong[1], Anuwat Ratsamisomsi[2], and Warawut Tiyapongpattana[2]

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AC-P-074

Quantification of sulfite by in-situ generation and electrochemical detection of SO2 gas on a graphene printed sensor

Nuttamon Khoonrueng[1], Nanthatchaphon Jantawong[1], Paithoon Prasertying[1], Phoonthawee Saetear[1], Prapin Wilairat[1], Kanchana Uraisin[1], and Duangjai Nacapricha[1]

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Fabrication of ion-selective electrode for potentiometric detection of mercury (II)

Pheerawit Photichot[1], Win Bunjongpru[2], Woraphan Chaisriratanakul[2], Nutthaphat Thornyanadacha[2], Awirut Srisuwan[2], Apirak Pankiew[2], Kondee Chauyrod[2], Panumart Thongyoo[3], and Nathawut Choengchan[3]

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Preparation of modified eggshell for fabrication of hydrophobic barrier of paper-based analytical device

Kanyapak Thangjitsirisin[1], Nathawut Choengchan[1], and Panpailin Seeharaj[1]

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A paper-based device for fluorometric determination of iodate

Aurachat Lert-itthiporn[1], Pongpichet Srikritsadawong[1], and Nathawut Choengchan[1]

AC-P-080

Simple mask-printing for producing electrochemical paper-based analytical devices.

Chompoonut Keawmamuang[1], Duangjai Nacapricha[1], and Paithoon Prasertying[1]

AC-P-081

Sampling method for electrochemical analysis of signature metal in gunshot residue on solid targets

thunwarat nonthasawatsri[1], Thinnapong Wongpakdee[1], Paithoon Prasertying[1], Supatana Buking[1], Nuanlaor Ratanawimarnwong[1], Kanchana Uraisin[1], a nd Duangjai Nacapricha[1]

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AC-P-082 Feasibility study of gunshot residue analysis for identification of the bullets using voltammetric finger-print and signal ratio

Kittipat Boonto[1], Nanthatchaphon Jantawong[1], Paithoon Prasertying[1], Thinnapong Wongpakdee[1], Nutnaree Fukana[1], and Duangjai Nacapricha[1]

AC-P-083 A procedure development for accuracy measurement in the determination of KOH number in hevea brasiliensis latex

Wilairat Cheewasedtham[1], Thitima Rujiralai[2], Najmee Hemmad[2], and Nadeeya Samae[2]

AC-P-084 Development of modified tannin paper-based extraction device for spectrophotometric determination of lead

Vanlada Suksomphot[1], Chanpen Karuwan[2], and Nuanlaor Ratanawimarnwong[2]

AC-P-086 Simplified laminated paper-based analytical device with diameter-based measurement for lead analysis

Nunnapat Suwancharoensuk[1], and Phoonthawee Saetear[1]

AC-P-087 Taylor dispersion analysis based on light scattering for non-UV absorbing compound

Supanut Prom-in[1], Rewat Nakwisai[1], Hervé Cottet[2], and Phoonthawee Saetear[2]

AC-P-088 Application of cryogen free modulator in two-dimensional gas chromatography for the analysis of fatty acid methyl esters

Adrian Jose Sacan[1], Nuttanee Tungkijanansin[1], and Chadin Kulsing[1]

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AC-P-089

One-step hydrothermal process for FeO particles synthesis and characterization

Angwara Khiaomueang[1], Anchana Preechaworapun[1], T anin Tangkuaram[1], Wikanda Saelo[1], Wannasa Boonprom[1], and Anurak Chitbuengphrao[1]

AC-P-090

Application of colorimetric development on paper for detection of total flavonoid content in Thai herp samples

Jirawan Khongyoo[1], Putcharin Kunking[1], Kanjana Wanthongsuk[1], Chutaporn Nithitawan[1], Anurak Chitbuengphrao[1], Tanin Tangkuaram[1], Anchana Preechaworapun[1], and Kulwadee Pinwattana[1]

AC-P-091

Downscaling in pharmaceutical analysis using simple smartphone-based colorimetric detection for benzalkonium chloride

Suphakorn Katib[1], Jutamas Jiaranaikulwanitch[1], Busaban Sirithunyalug[1], Kate Grudpan[2], Sutasinee Apichai[2], Thanawat Pattananandecha[2], and Chalermpong Saenjum[2]

AC-P-092

Enhancing the Performance of Colorimetric Aptasensor for the Detection of Δ9-THC by Pyrrolidinyl Peptide Nucleic Acid

Phichai Phoemsuk[1], Samatchaya Sungnoi[1], Kriangsak Faikhruea[2], Kornkanya Pratumyot[2], Choladda Srisuwannaket[2], and Tirayut Vilaivan[2]

AC-P-093

Smartphone-based electrochemical immunobiosensor for CEA detection

Benyarat Intajan[1], Praphatsorn Mangkronkaew[1], Puttaporn Klayprasert[1], Supada Khonyoung[2], Chanida Puangpila[3], and Jaroon Jakmunee[3]

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AC-P-094 Determination of dopamine by carbon electrodes from spent coffee ground

Dr.Prachak Inkaew[1]

AC-P-095 Fabrication of compact disc electrodes for hydroquinone determination

Chaowalee Sittipolan[1], Thaneeya Hawiset[1], and Prachak Inkaew[1]

AC-P-096 Determination and preconcentration of Pb by dispersive solid phase extraction

Apinya Navakhun[1]

AC-P-097 Fabrication of environmental friendly µPADs using 3D printing

napaporn bunnaranurak[1], and Napa Tangtreamjitmun[1]

AC-P-099 Interactive effects of pH and electrical conductivity on extraction yield and total curcuminoids content of Curcuma longa L.

Naronk Duangkaew[1], Kanchana Watla-iad[1], Plaipol Dedvisitsakul[1], and Thanakorn Maneerat[1]

AC-P-100 Extraction of chemicals of dried coffee cherry husks using natural deep eutectic solvents

Wiriya Chuankid[1], Kanchana Watla-iad[2], and Patcharanan Choto[3]

AC-P-101 Paper-based titrations for aluminum determination

kanokporn maneerat[1], Thaneeya Hawiset[1], and Prachak Inkaew[1]

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AC-P-102	Variation of mineral nutrients in soil and arabica coffee green bean from Northern Thailand using inductively coupled plasma-mass spectroscopy Miss Ketsuda Pawong[1], and Dr.Kanchana Watla-iad[1]
AC-P-103	Comparison of antioxidant activity in camellia sinensis originated from different countries Jitlada Pongphattranit[1], Kanchana Watla-iad[1], Plaipol Dedvisitsakul[1], and Somrudee Nilthong[1]
AC-P-104	Point of care device for determination of total cholesterol in blood Chanisara Pimprasit[1], Kanchana Watla-iad[1], Suphakorn Katib[1], and Plaipol Dedvisitsakul[1]
AC-P-105	Simple device for the determination of sodium ion in urine samples Jirayut Thaojun[1], Kanchana Watla-iad[1], and Plaipol Dedvisitsakul[1]

CC - Catalytic Chemistry

CC-P-007 Guerbet Alcohol Preparation from Linear Alcohol
Patcharalak Phowang[1], and Duangamol Tungasmita[1]

CC-P-013 In situ exsolution of La0.3Sr0.7Ti0.9Co0.1O3-x cathode for CO2 and H2O co-electrolysis using solid oxide electrolysis cell
Sothearoth Heng[1], and Pattaraporn Kim[1]

CC-P-014 Cationic Quaternary Ammonium Polymers Featuring Pyridine - Triazole Ligands: Synthesis and Application in Copper-Catalyzed Aerobic Alcohol Oxidation in Water
Panita Maneenut[1], and Preeyanuch Sangtrirutnugul[1]

CC-P-015 Characteristics of transesterification between palm oil and methanol with anion exchange resin
Zargul Ammara[1], and

CC-P-018 The synthesis of mixed metal high entropy oxybromides (SrxBa1-xBiO2Br) for photocatalytic degradation of tetracycline antibiotic
Chakgrid Noomak[1], and Numpon Insin[1]

CC-P-019 Effects of Yttrium metal loading on V2O5/TiO2 catalyst in the selective oxidation of H2S to elemental sulfur
Artittaya Suksri[1], and Piyasan Praserthdam[1]

CC-P-022 Visible light photodegradation of methylene blue using ZnIn- and ZnCoIn-layered double hydroxide and mixed metal oxide as photocatalyst
febby yulia hastika[1], Nipaporn Pongkan[1], Chomponoot Suppaso[1], and Nithima Khaorapapong[1]

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CC-P-024	Synthesis of a LaNiO3@CeO2 core-shell catalyst for carbon dioxide reforming of model biogas Juthamard Kiatirabil[1], and Merika Chanthanumataporn[1]
CC-P-026	Porous silica supported nickel catalysts for deoxygenation of oleic acid Praphavis Boonchuer[1], Pawnprapa Pitakjakpipop[2], and Wipark Anutrasakda[2]
CC-P-032	Aerobic oxidation of 5-hydroxymethylfurfural towards 2,5-diformylfuran catalyzed by CeMnOx Warinda Tirdtrakool[1], and Jonggol Tantirungrotechai[1]
CC-P-035	Cu/cellulose catalysts: Adsorption and reduction of Cu(II) on thiol-functionalized cellulose filter paper Jariyaporn Sangkaworn[1], Waranya Limprasart[1], and Jonggol Tantirungrotechai[1]
CC-P-036	Preparation of functionalized Chitosan-cellulose as a green support for Cu catalysts Waranya Limprasart[1], Jariyaporn Sangkaworn[1], and Jonggol Tantirungrotechai[1]
CC-P-037	Effect of 4-methoxyphenol in Ziegler-Natta catalysts on ethylene polymerization Satayu Borsap[1], and Jonggol Tantirungrotechai[1]

CE - Chemical Education

CE-P-002 Action research on learning through active learning in Mahidol Wittayanusorn School students: On the topic of rate of reaction and factor of the reaction

Sorachai Sae-lim[1]

CE-P-003 Preparation of bio-calcium carbonate from green mussel shells

Mr. Jiranat Chaiyosburana[1], Mr. Nutthaphol Khupsathianwong[2], Mr. Sarayut Rakmak[3], Mr. Peeranut Prakulpawong[3], and Mr. Chutiparn Lertvachirapaiboon[4]

CE-P-004 Mini-course of teacher training workshop in chemical bonding topic for enhancing students' learning competencies

ดร.ฉรงค์ศักดิ์ ขุนรักษา[1]

CE-P-006 Online learning: small scale experiments with simple colorimeter during COVID-19

Nattapat Kaewthong[1], Supakorn Boonyuen[1], and Supawan Tantayanon[2]

CE-P-007 Low-cost simple colorimeter for education and antioxidant analysis

Suchanun Phuangnak[1], Panod Lukkanavaraporn[1], Supakorn Boonyuen[1], and Supawan Tantayanon[2]

CE-P-008 The study of bringing on duck and chicken eggs

Lanlana Phumipatyothin[1], Chanapa Manakan[1], Itthiphat Phinphatphro[1], Phudthinun Staryuskulwongse[1], and Supakorn Boonyuen[2]

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CE-P-009	Towards a newly designed elective course: The introduction of flow-based analysis for science high school students through hands-on activities Nuchutha Thamsumet[1]
CE-P-010	Green chemistry: A bioplastic experiment for teaching concept of design for degradation Usa Jeenjenkit[1]
CE-P-011	Development of spreadsheet based simulation to support learning of optimization process in gas chromatography Chisanupong Kunmas[1]
CE-P-012	Developing metacognitive capacity of high school students in teaching chemistry Le Thanh Vinh[1], Chu Le Bao Lan[1], and Trần Mạnh Linh[1]
CE-P-013	ELC: Music Video for electrochemistry Concept Tanchanok Poonsin[1], Nattarika Petchchaithong[1], Netnapha Chana[1], and Ninna Jansoon[1]

EE - Environmental Chemistry and Renewable Energy

EE-P-006 Methane Synthesis via Carbon Dioxide Plasma Methanation in Dielectric Barrier Discharge Plasma Reactor

Waranyu Phondet[1], Nuttakit Udomjitpittaya[1], Teerawit Laosombut[1], Panida Thepkhun[1], Thanita Sonthisawate[1], Chatuphon Uthaisri[1], Niramai Traiyawong[1], and Napaporn Klaijieam[1]

EE-P-007 The Investigation of Natural Insulating Fluid of Chemically Modified Palm Oil Ester via 2-Stage Transesterification.

Thanita Sonthisawate[1], Pattarapohn Tangphutthiuransakul[1], Nuttakit Udomjitpittaya[1], Waranyu Phondet[1], and Piyanan Sreesiri[1]

EE-P-008 Removal of Hydrogen Sulfide from Biogas via a Simple Dielectric Barrier Discharge

Niramai Traiyawong[1]

EE-P-011 Influent of transition metal (Co, Ni, and Cu) oxides doped activated carbon derived from apricot endocarp waste to CO2 sorption properties

Suppachok Lawanaskol[1], Songwuit Chanthee[1], Channarong Asavatesanupap[2], and Malee Santikunaporn[2]

EE-P-012 Green synthesis and photocatalytic activity of Cu/ZnO nanocomposite from aloe vera leaf extract for antibacterial and dye degradation applications

Yanada Trakulchalermchai[1], Songwuit Chanthee[1], Channarong Asavatesanupap[2], and Malee Santikunaporn[2]

EE-P-013 Effect of magnesium incorporation in MCM-41 material on methylene blue adsorption

Thitirat Sirihengcharoen[1], and Jonggol Tantirungrotechai[1]

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EE-P-015 Optimum stainless electrodes on hydrogen production by alkali electrolysis

Rujira Jitrwung[1], Kuntima Krekkeitsakul[1], Hiran Jinda[1], Parinya Thongyindee[1], Weerawat Patthaveekongka[2], Natthanich Thongmee[2], and Sasiphan Deenan[2]

EE-P-016 Improvement of biohydrogen production from molasses using Enterobacter Aerogenes by adding trace elements

Kuntima Krekkeitsakul[1], Rujira Jitrwung[1], Hiran Jinda[1], and Parinya Thongyindee[1]

EE-P-018 Composite from spent coffee ground and iron nanoparticles produced by coffee extract for arsenic removal

Wachirapol Manimont[1], and Fuangfa Unob[1]

EE-P-019 Carbon Based Materials For The Decolorization In Sugar Production

Jieansumran[1], and Asst. Prof. Dr. Khanin Nueangnoraj[1]

EE-P-020 Biodiesel Production via a Micro Reactor by using a Heterogeneous Catalyzed Transesterification from Sacha Peanut Seed Oil

Anusorn Vorasingha[1], Chaturong Suparpprom[1], and Namfon Baothongkam[1]

EE-P-022 Ni-Doped Malachite/Rouaite Nanowires/Cassava Peel-Derived Activated Carbon High-Performance Asymmetric Supercapacitor

Thanapat Jorn-am[1], Wasinee Pholauyphon[1], Preeyanuch Supchocksoonthorn[1], Chalathorn Chanthad[2], and Peerasak Paoprasert[2]

EE - Environmental Chemistry and Renewable Energy *(con't)*

EE-P-023 Electrochemistry of Lithium Chloride Based "Water-in-salt" Electrolyte

Ms. Aritsa Bunpheng[1], and Dr.Pawin Iamprasertkun[1]

EE-P-024 Hemp Waste-derived Activated Carbon Electrode and Electrolyte for High-Performance Supercapacitor Applications

Pattaramon Meefang[1], Thanapat Jorn-am[1], Preeyanuch Supchocksoonthorn[1], and Peerasak Paoprasert[1]

EE-P-025 Development of high-performance, low-cost hybrid supercapacitors from coconut coir and nickel titanate nanosphere

Nareekarn Meebua[1], Thanapat Jorn-am[1], Preeyanuch Supchocksoonthorn[1], Jedsada Manyam[2], Tanagorn Kwamman[3], and Peerasak Paoprasert[3]

EE-P-026 CARBON-BASED SOLID SORBENT FOR PERFLUOROOCTANOIC ACID REMOVAL

Ruangrong Sukom[1], and Asst. Prof. Dr. Khanin Nueangnoraj[1]

EE-P-027 Demonstration of High Voltage Supercapacitor Using Activated Carbons in Water-in-Salt (WiSE) Electrolyte: Practical Design in Coin Cell Configuration

Anawan Klanhun[1], Pochara Thepmongkol[1], Kitdakarn Matpongthavorn[1], Aritsa Bunpheng[1], Phongphot Sakulaue[1], Pawin Iamprasertkun[1], and Khanin Nueangnoraj[1]

EE-P-029 Decolorization and Detoxification of industrial textile effluent by Bacillus sp. FN2

Sinthuwat Ritthitham[1]

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EE-P-030 Metal Ion Detection in Water with Black Gluten Rice extract

Rattanaprapha Joyin[1], Duangporn Garshabi[2], and Preecha Thiampanya[3]

EE-P-031 Photocatalytic Performance of Bi2O3/Chitosan Beads for Tetracyclin Degradation under Natural Solar Light Irradiation

Chivalrat Masingboon[1], Nuttachai Prongmanee[1], Orapan Intharuksa[1], Wuttichai Wongnarat[1], Kraisak Kraisornwong[1], Theanchai Panphojan[1], and Ruethaithip Dulyasucharit[1]

EE-P-032 Economic cost estimation of hydrogen generator by alkali water electrolysis skid like battery module

Rujira Jitrwung[1], Kuntima Krekkeitsakul[1], Hiran Jinda[1], and Parinya Thongyindee[1]

EE-P-033 Size Dependent Graphene Support for Decorating Gold Nanoparticles as a Catalyst for Enhanced Hydrogen Evolution Reaction

Boontarika Saeloo[1], Weekit Sirisaksoontorn[1], a nd Wisit Hirunpinyopas[1]

EE-P-036 Lead removal from water using functionalized-activated carbon derived from banana stem

Imelda Octa Tampubolon[1], and Numpon Insin[1]

EE-P-037 Facile fabrication of ZnS/molasses-derived activated carbon composites as electrodes for high-performance supercapacitor

Arsikan Ratchatacharoensak[1], Ingchanik Dithabumroong[1], Chalathorn Chanthad[2], and Peerasak Paoprasert[2]

EE - Environmental Chemistry and Renewable Energy *(con't)*

EE-P-038 Catalytic Conversion of Fatty Acid Distillate to bio-hydrogenated diesel over Monometallic and bimetallic supported on ZSM-5

Natnicha Ritmun[1], Apiluck Eiad-ua[2], Atthapon Srifa[3], Worapon Kiatkittipong[4], and Suttichai Assabumrungrat[4]

EE-P-039 Extraction of Chromium from Contaminated Wastewater with Deep Eutectic Solvent

นาย ปราชญ์ปริญ คำน้อย[1]

EE-P-040 Re-utilization of wastewater discarded from hydrothermal carbonization process

Amornrat Suemanotham[1], Natthawan Prasongthum[1], Wanchana Sisuthog[2], Parichat Yamsri[2], Pathompat Khowattana[2], Chaiyan Chaiya[2], Yoothana Thanmongkhon[2], and Lalita Attanatho[2]

EE-P-041 Characterization of PM2.5-bounded metals and water-soluble ions during Loy Krathong Festival in Chiang Mai, Thailand

Duangduean Thepnuan[1], Wittawat Insean[2], Phichit Phromsenjai[3], Pavidarin Kraisitnitikul[4], and Somporn Chantara[4]

EE-P-044 The validation of PM2.5 measurement device in Muban Chombueng Rajabhat University Ratchaburi

Paitoon Mueanpetch[1]

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FA - Food and Agricultural Chemistry

FA-P-001

Effect of Coconut Cream with Extracted Turmeric used as Feed Supplement on Growth Performance and Survival Rate of Macrobrachium rosenbergii

Norasing Penprapai1[1], Samphan Promhom[1], and Pensri Penprapai[2]

FA-P-002

Determination of total phenolic content and antioxidant activity of medicinal plants

Sinee Siricoon[1], Phakamas Sombatmak[1], Wiriyaporn Sumsakul[1], Waraporn Sorndech[1], Thongkorn Ploypetchara[1], Siriporn Butseekhot[1], and Chiramet Auranwiwat[1]

FA-P-003

Effect of pretreatment and freezing methods on the properties of Parkia speciosa freezing and thawing

Thongkorn Ploypetchara[1], Wilawan Kuhawasinee[1], Shanitha So-choo[1], Waraporn Sorndech[1], Siriporn Butseekhot[1], Wiriyaporn Sumsakul[2], Chiramet Auranwiwat[2], and Sinee Siricoon[2]

FA-P-004

Relationship between starch composition and molecular structure and physicochemical and functional properties of Thai certified rice cultivars

Wichian Sangwongchai[1], Kanitha Tananuwong[2], Kuakarun Krusong[3], Supidcha Natee[4], and Maysaya Thitisaksakul[5]

FA-P-006

Proposed Structures of Chemical Component Based on Gas Chromatography-Mass Spectrometry Analyses in Siam Cardamom (Amomum cardamomum L.)

Mayoon Lamsub[1]

FA-P-007

Isotope Ratio Mass Spectrometry for Analyzing Carbon and Nitrogen Isotope Ratios in Southern Rice Samples

Chunyapuk Kukusamude[1], and Supalak Kongsri[1]

FA - Food and Agricultural Chemistry *(con't)*

FA-P-008 Discrimination of Geographical Origin of Thai Local Rice in Nakhon Si Thammarat Province Based on Multi-element Fingerprinting by Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Supalak Kongsri[1], and Chunyapuk Kukusamude[1]

FA-P-009 Development of biopolymers from rice husks: preparation and properties

Pongpat Mattayathana[1], Tatita Neabsanit[1], Puwarich Pattarapipat[1], and Sa-Ad Riyajan[1]

FA-P-010 Ozone modification of cassava starch and its blend: preparation and properties

Saad Riyajan[1]

FA-P-011 Formulation and characterization of slow-release urea fertilizer hydrogel beads based on sodium alginate and poly(vinyl alcohol)

Katsiri Tontapthai[1], Naphat Laemkhom[1], and Wilaiporn Kraisuwan[1]

FA-P-012 Purification and separation of beta-carotene in green vegetables by reverse phase high performance liquid chromatography

Nattika Thanuthong[1], and Saiphon Chanpaka[1]

FA-P-013 Proximate Composition and Antioxidant Activity of Hang Rice and Hang Rice Milk of Local Upland Rice Cultivars in Ratchaburi Province, Thailand

Sutthirak Uansiri[1], and Kwanyuen Leamsamrong[2]

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IC - Inorganic Chemistry

IC-P-002 Synthesis of hierarchical porous catalysts for oxidative desulfurization of model diesel fuel
Jutharat[1], and Wipark Anutrasakda[2]

IC-P-003 Desulfurization of model fuel under a continuous flow system
Wanwisa Chaolemphong[1], and Wipark Anutrasakda[1]

IC-P-008 The pH Effect on the Efficiency of Phosphate Fire Retardants
Kullatat Suwatpipat[1], Kanjarat Sukrat[2], Pichthida Jittamaro[3], Nathawat Poopakdee[3], and Warut Thammawichai[3]

IC-P-012 Theoretical insights into the mechanism of Iridium-catalyzed decarbonylative C-C coupling of acyl fluorides
Chawakorn Chansaenroch[1], and Tanin Nanok[1]

IC-P-015 Extraction of silica from municipal incinerator bottom ash
Phanumat Junthrathit[1], and Thitipone Suwunwong[1]

IC-P-017 Dye adsorption properties of a novel three-dimensional interpenetrating copper(II) coordination polymer constructed from 2-hydroxybenzoate and 4,4'-bipyridine
Nanthawat Wannarit[1], Kittipong Chainok2[2], Sirinan Thanma[2], and Chompunuch Bunfrueang[2]

IC-P-018 Copper(II) Complex with Diamino-Imidazole Ligand: Synthesis, Characterization and Electrocatalytic Activity Study
Narisara Tanjedrew[1], and Supavadee Kiatisevi[1]

IC - Inorganic Chemistry *(con't)*

IC-P-021 Novel 2D zinc(II) coordination polymers containing mixed ligands: CO2 adsorption and multifunctional fluorescence sensing properties

Kenika Khotchasanthong[1], Filip Kielar[2], Winya Dungkeaw[3], Bunyarat Rungtaweevoranit[4], Mongkol Sukwattanasinitt[5], Taradon Piromchart[6], and Kittipong Chainok[6]

IC-P-022 X-ray crystallographic structures of the copper(II) based MIL-53 type framework

Kunlanit Chinchan[1], and Kittipong Chainok[1]

IC-P-024 High pressure CO2 adsorption in an ultramicropore lanthanide-oxalate-formate framework

Kanthida Kummoon[1], Kittipong Chainok[1], and Bunyarat Rungtaweevoranit[2]

IC-P-025 High-pressure CO2 adsorption in four isostructural 3D lanthanide-tetrabromoterephthalate frameworks

Suwadee Jiajaroen[1], Winya Dungkaew[2], and Kittipong Chainok[2]

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IE - Inorganic Chemistry

IE-P-015 Lignin extraction method from para rubber wood sawdust with deep eutectic solvent
Julalak Phinitphutchaphong[1], Kanokorn Yodsri[1], Nichakorn Oncharoen[1], Waralee Watcharin2[2], and Laemthong Chuenchom[2]

IE-P-016 Comparison of firing temperature of red clay and coffee grounds on physical and microstructure of hydroponic vegetable planting materials
Soravich Mulinta[1]

IE-P-019 Conversion of food waste to fertilizer in a week
parichat yamsri[1], and Apichat Jansod[1]

MN - Material Chemistry and Nanotechnology

MN-P-003 Characteristics study of latex rubber mixed with thermal-treated TiO2 under UV irradiation

Kusuma Srinakruang[1], Kullatat Suwatpipat[2], and Kanjarat Sukrat[2]

MN-P-004 Preparation and characterization of composite films from xyloglucan for food packaging applications

Chonnikan Tamkla[1], Thitirat Inprasit[1], Sarute Ummartyotin[1], and Penwisa Pisitsak[1]

MN-P-005 Bioactive-packaging films based on whey protein and alginate

Atcharaporn Botalo[1], Thitirat Inprasit[1], Sarute Ummartyotin[1], and Penwisa Pisitsak[1]

MN-P-006 Freeze-dried biopolymer-based hydrogels crosslinked with glutaraldehyde for study of drug release applications

Umpornpan Ninjumrat[1], Piyachat Chuysinuan[2], Thitirat Inprasit[2], Sarute Ummartyotin[2], and Penwisa Pisitsak[2]

MN-P-010 Ditriazole-functionalized cyclohexane ligand: its versatility in coordination structure and the difficulty of metal-organic nanotube formation in the absence of pi-pi stacking

Phattananawee Nalaoh[1], Jacob A. Barrett[1], and David M. Jenkins[1]

MN-P-012 Influence of pH on swelling properties of tannic acid hydrogel for Cu(II) removal by adsorption process

Pornpimol Prayongpan[1], Parichart Chunhakowit[1], Yada Phabjanda[2], Atchara Aunwisat[2], Thassaphon Damrongchua[2], Supakon Vangban[2], and Napaworn Sangrayub[2]

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MN-P-018	Encapsulation of vitamin A with sodium alginate using coaxial electrospray technique Rungluethai[1]
MN-P-019	Synthesis and characterization of Zr-Al-SBA-15 Thawalrat Laksanaprommarat[1], and Jonggol Tantirungrotechai[1]
MN-P-020	Electrospun nanofibers containing ascorbic acid-loaded halloysite nanotubes for cosmetic applications Tachini Kaosamang[1], Kannika Jeamjumnunja[1], and Wilai Siriwatcharapaiboon[1]
MN-P-021	Halloysite Nanotube as a Carrier for Biologics Delivery in Fish Jaturaporn Waenwong[1], Ansaya Pumchan[1], Sasimanas Unajak[1], and Chaiya Prasittichai[1]
MN-P-022	Effect of C2 hydrocarbon–acetylene compositions on morphology and chemical structure of carbon black synthesized by acetylene black process Jukkawat Rueangthammarong[1], Kanet Wongravee[2], and Prompong Pienpinijtham[2]
MN-P-023	Sugarcane bagasse converted graphitic carbon nanomaterials for ractopamine detection Rawisara Tunchareon[1], Rattanaporn Chanthakit[1], Pacharapon Kankla[1], and Patraporn Luksirikul[1]
MN-P-024	Surface functionalized 3DOM SiO2 for TNT detection Peerasut Seesuwan[1], Theeracgart Leepasert[1], and Supakit Achiwawanich[1]

MN - Material Chemistry and Nanotechnology *(con't)*

MN-P-026 The synthesis of magnetic molecularly imprinted polymer for aflatoxin adsorption

Wanrasa Bilhod[1], and Numpon Insin[1]

MN-P-027 Advanced Composite Film of Low-Density Polyethylene (LDPE) and Macca Carbon for Use in Packaging

Natdanai Sakdapipanich[1], Phawasoot Rodgerd[2], and Jitladda Sakdapipanich[2]

MN-P-031 High performance antimicrobial composition for porous surface

Pisan Uawithya[1], and Churat Tiyapiboonchaiya[2]

MN-P-033 Macca Carbon: Synergistic Effect of Far-Infrared Ray and Negative Ion on Wound Healing in Otolaryngologic Cancer Patients

Patcharaporn Ruengsak[1], Phawasoot Rodgerd[1], Payungsak Sakdapipanich[2], and Jitladda Sakdapipanich[2]

MN-P-035 Quaternary amine-functionalized magnesium ferrite-based nanoadsorbent for removal of Congo Red

Tanapong Kunakham[1], Supawitch Hoijang[1], Supon Ananta[2], and Laongnuan Srisombat[2]

MN-P-038 Effect of gold nanostructures on plasmonic enhancement of enzyme-linked immunosorbent assay for latex allergen detection

Apichat Phengdaam[1], Benjaporn Phupet[2], Phanthipha Runsaeng[2], and Sanong Ekgasit[3]

MN-P-041 Reversing the Push-Pull Effect in Some Poly-2,7′,1′,6″-[3] calicenes: A Density Functional Theory Investigation

Thawalrat Ratanadachanakin[1], Thawalrat Ratanadachanakin[1], Willard E. Collier[2], and Willard E. Collier[2]

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MN-P-042 Real-time acetone vapor sensor using carbon dots as sensing materials and the study of electronic and interfacial interactions using density functional theory

Nichaphat Thongsai[1], Panichakorn Jaiyong[2], Sumana Kladsomboon[3], Insik In[4], and Peerasak Paoprasert[4]

MN-P-044 Preparation of Anthocyanin Rich-Berry Extracts-Fe3O4 Biocomposites and their Antibacterial activity.

Chanapa Manakan[1], Lanlana Phumipatyothin[1], Itthiphat Phinphatphro[1], Paramasivam Shanmugam[2], and Supakorn Boonyuen[3]

MN-P-045 Modification surface of titanium dioxide nanoparticles with carbon dots and their photocatalytic activity

Cheewita Suwanchawalit[1], and Narit Triamnak[2]

MN-P-050 A facile one-pot hydrothermal technique of Gold, Silver and Cerium oxide nanoparticles encapsulated SBA-15 for their excellent dye adsorption

Panod Lukkanavaraporn[1], Nattapat Kaewthong[1], Suchanun Phuangnak[1], Thussanee Mananunsap[1], and Supakorn Boonyuen[1]

MN-P-051 Synthesis and characterization of WO3/MgAl2O4 nanocomposites for enhanced photocatalytic activity

Worachita Wongtawee[1], Pongsaton Amornpitoksuk[1], and Sumetha Suwanboon[1]

MN-P-054 Nanoporous carbon from hemp waste via pyrolysis assisted microwave activation

Korn Sukphunphoncharoen[1], Chaimongkol Thawonthae[1], Napat Kaewtrakulchai[2], Tawat Suriwong[3], Gasidit Panomsuwan[3], Masayoshi Fuji[4], and Apiluck Eiad-ua[4]

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MN-P-057 QUENCHING EFFIFICIENCY OF FLUORESCENT CARBON NANODOTS BY NITROAROMATIC COMPOUNDS AS SOME QUENCHERS

Thussanee Mananunsap[1], Opas Tojira[1], Saruta Sornsiri[1], Chutikarn Pradit[1], and Supakorn Boonyuen[1]

MN-P-058 Reusable flexible halochromic cellulose-based composite tape for visual alkaline leaking point detection: Preparation and property testing

Sirawit Fuwongsit[1], and Nonsee Nimitsiriwat[2]

MN-P-059 Bio-nanocomposite films of ethyl cellulose/cellulose nanocrystal from pineapple leaf

Narathon Pramuanthanyatath[1], Suphattra Khlaiya[1], Asst. Prof. Dr. Uraiwan Intatha[2], and Asst. Prof. Dr. Nattakan Soykeabkaew[3]

MN-P-060 Selective conversion of glucose into 5-hydroxymethylfurfural by mesoporous ZSM-5 zeolite

Saowaluk Inpaeng[1], and Karaked Tedsree[1]

MN-P-064 Physicals Properties of Low-Temperature Crystalline Glaze with for Earthenware Products

Soravich Mulinta[1]

MN-P-066 Naphthothiadiazole derivative with combined hybridized local and charge transfer (HLCT) and aggregation-induced emission (AIE) characteristics as deep-red emitter for OLEDs

Suangsiri Arunlimsawat[1], Patteera Funchien[1], Pongsakorn Chasing[1], Taweesak Sudyoadsuk[1], and Vinich Promarak[1]

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MN-P-069 Effect of heat treatment on physical properties of nano-CaCO3 powders from mussel shell waste

Nittaya Keawprak[1], Sanong Ekgasit[2], Chutiparn Lertvachirapaiboon[3], Antiya Natchayasap[3], Pisuit Arkom[3], Jira Patthanavarit[3], and Panita Thaweethaworn[3]

MN-P-070 Modification of polysulfone flat sheet membrane using graphene oxide for CO2/CH4 separation

Nattaporn Chutichairattanaphum[1], Arisa Jaiyu[1], Julaluk Phunnoi[1], Passakorn Sueprasit[1], Malinee leekrajang[1], and Borwon Narupai[1]

MN-P-071 Preparation and surface characterizations of activated carbon from spent coffee ground

Naphat Sansirikun[1], Thaneeya Hawiset[1], Somwan Chumphongphan[1], and Prachak Inkaew[1]

MN-P-073 Preparation and physicochemical characterization of starch-based biofilms from potato peels

Rajesh Pandit[1], Binod Shrestha[1], and Rameshwar Adhikari[2]

NP - Natural Products, Biological Chemistry and Chemical Biology

NP-P-002

Prevalence and characterization of extended-spectrum beta-lactamase producing Escherichia coli and Klebsiella pneumoniae isolated from clinical samples in a Tertiary Care Center, Southern Thailand

Phanvasri Saengsuwan[1], Chonticha Romyasamit[2], Phoomjai Sornsenee[2], and Soontara Kawila[2]

NP-P-004

Efficacy of Curcuma mangga extract for anti-biofilm activities against pathogenic bacteria biofilm

Nanthawan Reuk-ngam[1], Panita Khlaychan[1], Wansuda Sutinan[1], Phonchanok Reuk-ngam[1], Nitirat Chimnoi[1], Chulabhorn Mahidol[1], and Supanna Techasakul[1]

NP-P-005

Antibacterial and anti-biofilm activity against Staphylococcal biofilm of Hedychium coronarium extarct

Panita Khlaychan[1], Nanthawan Reuk-ngam[1], Wansuda Sutinan[1], Phonchanok Reuk-ngam[1], Nitirat Chimnoi[1], Chulabhorn Mahidol[1], and Supanna Techasakul[1]

NP-P-006

Antibacterial and antibiofilm activities of Piper betle extract on Staphylococcus biofilm

Wansuda Sutinan[1], Nanthawan Reuk-ngam[1], Panita Khlaychan[1], Phonchanok Reuk-ngam[1], Nitirat Chimnoi[1], Chulabhorn Mahidol[1], and Supanna Techasakul[1]

NP-P-007

The validation of the lactic acid production using Lactobacillus farciminis KUJ 25-S for bio-polylactic acid production

Kangsadan Boonprab[1], Suppasit Tienphranon[2], Pornpat Panput[3], Areeya Tantiwatchareekul[3], and Vichien Kitpreechavanich[4]

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NP-P-008	Chemical composition and in vitro cytotoxic effects of sesquiterpene and phenylbutenoids from Zingiber cassumunar rhizomes Pongsit Vijitphan[1], Arthit Makarasen[1], Suwicha Patnin[1], Decha Dechtrirat[1], and Supanna Techasakul[1]
NP-P-012	Chemical Constituents from the Twig and Leaf Extracts of Dasymaschalon wallichii Thanakorn[1], Patcharapol Siliwelawan[1], Chama Thamjamnein[1], Passakorn Teerapongpisan[1], and Surat Laphookhieo[2]
NP-P-013	Polyoxygenated Cyclohexene Oxides from the Twig of Uvaria dac Pierre ex Finet & Gagnep. Sorraya Champakam[1], Virayu Suthiphasilp[2], Passakorn Teerapongpisan[2], Piyaporn Phukhatmuen[2], and Surat Laphookhieo[2]
NP-P-014	Flavan and alkaloid derivatives from the leaves of Crinum amabile Kanda Panthong[1]
NP-P-015	Chemical constituents of the twigs extract from Uvaria hamiltonii and their in vitro cytotoxicity and antibacterial activities Virayu Suthiphasilp[1], Tharakorn Maneerat[2], Surat Laphookheio[2], Thidarat Duangyod[3], and Rawiwan Charoensup[3]
NP-P-016	The study of the antioxidant activity of Crotalaria juncea Linn. seed oil extract Chakree wattanasiri[1], Nutlada Nusontra[2], Naphatsorn Ditthawutthikul[3], and Acharavadee Bunkoom[3]

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NP-P-017

In vitro Fat Cell Differentiation in 3T3-L1 Inhibition, Proton NMR analysis and Fatty Acid Determination of Cashew (Anacadium occidentale L.) Nut Oils from Three Sources

Khanittha Chawananorasest[1], Pattrawadee Kengkwasigh[1], Sarunya Laovitthayanggoon[1], Supatcha Preecharueangrit[1], Vachiraporn Ajavakom[2], Tanapak Inyod[2], Runchana Funk[3], Kittirat Prangchan[3], and Sirinan Thubthimthed[4]

NP-P-018

Isolation, Structure Elucidation, and Biosynthesis of spiroaxillarone A, a Specialized Metabolite from Cyanotis axillaris

Awat Wisetsai[1]

NP-P-019

Structure and Fractionation of Lignin Extraction from Coconut Coir

Pornpen Atorngitjawat[1], and Sirikunya Jodnok[1]

NP-P-020

Isoflavones from Derris robusta (DC.) Benth. twigs and their α-glucosidase inhibitory activity

Cholpisut T.[1], Virayu S.[2], Apirak P.[3], Boonyanoot C.[4], David J. H.[5], Worrapong P.[5], Sarawut T.[6], and Surat L.[7]

NP-P-022

Solubility of Adenosine

Nuttamon Thaicharoen[1]

NP-P-025

Anti-obesity Evaluation on the Five Pure Compounds Isolated from Four Thai Medicinal Plants, Boesenbergia pandurata (Roxb.), Kaempferia parviflora, Curcuma aromatica and Vernonia amygdalina

Khanittha Chawananorasest[1], Papawee Saiki[1], Vachiraporn Ajavakom[2], Praphakorn Kaemchantuek[3], Kittirat Prangchan[3], Runchana Fank[3], and Sirinan Thubthimthed[4]

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NP-P-026

Alkylitaconic acids from culture of the basidiomycete Clitopilus sp. TBRC-BCC 73988

Jittra Kornsakulkarn[1], Kitlada Srijomthong[1], Sujinda Sommai[1], Pranee Rachtawee[1], and Chawanee Thongpanchang[1]

NP-P-027

Gas chromatography-mass spectrometry and molecular docking analyses of chemical constituents from ethanolic extract of Tacca chantrieri Andre rhizome against enzymes involving prostaglandin biosynthesis

SHISANUPONG ANUKANON[1], and CHAIYONG RUJJANAWATE[1]

NP-P-028

Preparation and characterization of rice bran oil-silver nanoparticles

Puntira Khatsri[1]

NP-P-030

The isolation and HPLC determination of imperatorin from Aegle marmelos (L.) Corr.

Chiramet Auranwiwat[1], Sinee Siricoon[2], Wiriyaporn Sumsakul[2], Thongkorn Ploypetchara[2], Waraporn Sorndech[2], and Siriporn Butseekhot[2]

NP-P-034

HPLC analysis and NMR-based metabolomics identification of biflavonoids in spike moss Selaginella plana

Ugyen Lhamo[1], Sakuna Wan-erlor[1], Sutthida Wongsuwan[2], Jaruwan Chatwichien[2], and Nopporn Thasana[3]

NP-P-035

Padangflavone A, a New biflavonid from Selaginella padangensis Hieron.

Yudis Ananda Putra[1], Sutthida Wongsuwan[2], Sakuna Wan-erlor[2], Jaruwan Chatwichien[2], and Nopporn Thasana[3]

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NP-P-036 Bacteriocin-producing lactic acid bacteria with antibacterial activity selected from fermented fish products

Chotirose Keawnongkae[1], and Piyorot Hongsachart[1]

NP-P-037 Synthesis of Organic Fluorescent Dyes for Screening protein aggregation in cell

Kittiporn Nakprasit[1], Napatsaporn Nuntavanotayan[2], Pitak Chuawong[2], and Chanat Aonbangkhen[2]

NP-P-039 Encapsulation of citronella essential oil for mosquito repellent film

Porramat Maneesuthum[1], Phuwanich Wanichwiwat[1], Swiss Sailabart[1], and usa jeenjenkit[1]

NP-P-040 Solubility profile of Royal jelly

Kullanun Paeyai[1]

NP-P-041 Phytochemical screening and antioxidant activity of the ethanolic extracts from Acalypha indica L.

Chanjira Jaramornburapong[1], Arunrat Sunthitikawinsakul[1], Rungtiwa Chidthong[1], Nichapat Obmasui[1], and Nichaphat Sriwong[1]

NP-P-042 Preliminary preparation of peroxidase from castor plant (Ricinus communis L.) using ammonium sulfate precipitation and aqueous two-phase systems

Phuwanat Kettsap[1], Sunutcha Piyaming[2], Apinun Kunpienjai[2], and Lalida Shank[2]

NP-P-044 Enzymatic activity of lyophilized cytochrome c in the presence of trehalose as a protective molecule

Sasiprapa Samsri[1], Julia A. Brom[2], Gary J. Pielak[2], and Soraya Pornsuwan[2]

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NP-P-045	Molecular encapsulation of phytochemicals with cyclodextrins: A computational study Saba Ali[1]
NP-P-046	The potential effects of an antioxidative peptide from riceberry on Endoplasmic reticulum (ER) stress Theeranuch[1], Sucheewin[1], and Chanat[1]
NP-P-047	The development of a chromogenic and fluorogenic rhodol-based chemosensor for the detection of hydrazine and its application in live cell bioimaging Kongaphisith Tongpoolsomjit[1], Rattha Noorat[2], Palangpon Kongsaeree[2], Suparerk Borwornpinyo[3], and Yongyut Pewkliang[4]
NP-P-048	Immobilization of lipase by surfactant CTAB-modified bentonite and nanoclay for the production of cosmetic esters Ms. Salisa Wongthepbut[1], and Kanchana Dumri[2]
NP-P-050	Chemical constituents from the stems of Bridelia stipularis (L.) Blume Oue-artorn Limtragool[1]
NP-P-052	Antioxidant extraction from Rocco Deep Gold Marigold (Tagetes erecta L.) by ultrasonic assisted extraction and maceration in ethanol for preparation of essence product formulation. Nattharat Mahaisub[1], Nissara Phasee[1], Wannisa Keawbankrud[1], Patsorn Intasan[1], a nd Pranudda Pimsee[1]
NP-P-053	Anti-DNA damage activity of compound from Bauhinia strychnifolia Craib stem Pattaravan Maliyam[1], and Panupong Puttarak[1]

NP - Natural Products, Biological Chemistry and Chemical Biology *(con't)*

NP-P-054 Cytotoxic and insecticidal constituents from the rhizomes of Stemona curtisii Hook f.

Olusola Idowu[1], Warinthorn Chavasiri[1], and Pattara Thiraphibundet[1]

NP-P-055 Phytochemical screening and antioxidant properties of ethanolic crude extract of Somkwai (Garcinia Pedunculata)

ดร. วินัย อวงพิพัฒน์[1], and นางสาวปรียานุช สง่าพล[1]

NP-P-056 Synthesis and anti-cancer activities of the stereoisomers of Cordyceamide A in a skin carcinoma cell line.

Suppakorn Netmanee[1], Satapanawat Sittihan[2], Teeraphan Laomettachit[3], Passorn Wonnapinij[4], Napachanok Mongkoldhumrongkul[4], and Pichamon Kiatwuthinon[4]

NP-P-057 Enhanced peroxidase activity of P76C cytochrome c mutant for colorimetric detection of phenylenediamine isomers at various pH values

Sataporn[1], Pattaree[2], Phuwalit[3], Kanokwan[4], Sasiprapa[5], and Soraya[6]

NP-P-058 Fabrication of curcumin-based ionic liquid in w/o/w emulsions

Niramon Maeda[1], Thamonwan Angkuratipakorn[2], Pannawadee Juntong[2], and Jirada Singkhonrat[2]

NP-P-059 Extraction of beta glucans from edible mushrooms, Lentinus squarrosulus, and rapid screening of the extracts by Fluorescence and UV/Vis Spectroscopy

Pwint Phyu Theint[1], N. Sakkayawong[2], Siriwit Buajarern[2], and Jirada Singkhonrat[2]

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NP-P-061

Enhancement of thermal stability of anthocyanin extract obtained from Carissa carandas pomace by β-cyclodextrin inclusion complexes

Witayapan Nantitanon[1], Pimpailin Rodpradit[2], and Natthawut Thitipramote[3]

NP-P-062

Study of chemical components in Huang-Qin (Scutellaria baicalensis Georgi roots) extract from different extraction methods

Nutlada Nusontra[1], Kaemanun Joomthong[2], Chonatjaya Kaewrak[2], Primrada Supatho[2], Acharavadee Bunkoom[2], and Chakree Wattanasiri[2]

NP-P-063

Chemical constituents from the leaves, flowers, and fruit of Cratoxylum cochinchinense (Lour.) Blume and their inhibitory of nitric oxide production

Thawatchai Nimitthawon[1], Pawassada Namhwat[1], Sorraya Champakam[1], Virayu Suthiphasilp[2], Passakorn Teerapongpisan[2], Piyaporn Phukhatmuen[2], and Surat laphookhieo[2]

NP-P-067

LC-MS/MS guided Network Pharmacology analysis to understand anti-inflammatory mechanism of Buabok (Centella asiatica) metabolites in decreasing NO production and TNF alpha secretion in LPS induced RAW264.7 cells in -vitro.

Narawadee Rujanapun[1], Wuttichai Jaidee[1], Kulawadee Malee[1], Subhadip Banerjee[1], Thidarat Duangyod[2], Tharakorn Maneerat[3], and Rawiwan Charoensup[4]

NP-P-068

Functional studies of a macrocyclic polylactone synthase from Menisporopsis theobromae BCC 4162

Thanakorn Deelee[1], and Pakorn Wattana-Amorn[1]

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NP-P-070 Molecular construction and purification of screening-tagged tryptophan 2-monooxygenase

Sirus Kongjaroon[1], Duangthip Trisrivirat[1], and Pimchai Chaiyen[1]

NP-P-071 Chemical constituents from the leaves of Croton krabas

Sunita Uk-at[1], Phiraphon Setsuwan[1], and Oue-artorn Limtragool[1]

NP-P-072 Chemical constituents from the tubers of Stephania pierrei Diels

Chaiwat Linphosan[1]

NP-P-073 Inhibition of human Monoamine Oxidase A and B by active constituent from Atractylodes lancea plant

Songklod Sarapusit[1], Sopa Ninted[2], Wanvisa Neadruensang[3], and Ekaruth Srisook[4]

NP-P-074 Heterologous expression of aristolochene synthase from Menisporopsis theobromae BCC 4162 in Aspergillus oryzae NSAR1

Thirat Anumon[1], and Pakorn Wattana-Amorn[1]

NP-P-075 Antimicrobial Activity of Single and Combined Extracts from Kaempferia parviflora and Rhinacanthus nasutus

Kulawadee Malee[1], Narawadee Rujanapun[1], Wuttichai Jaidee[1], Thidarat Duangyod[2], Tharakorn Maneerat[3], and Rawiwan Charoensup[3]

NP-P-077 Screening of antioxidant activities and total phenolic content of the methanol extracts from the roots of Amaranthus viridis L. and Coccinia grandis (L.) Voigt

Namfon Baowthongkum[1]

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NP-P-082

Inhibition on α-glucosidase and advanced glycation products (AGEs) formation by infusions produced from Northern Thai indigenous vegetables

Plaipol Dedvisitsakul[1], Kanchana Watla-aid[1], Jirapat Chinapunjaphol[1], and Salitta Supanam[1]

NP-P-084

Chemical constituents from the twig extract of Uvaria leptopoda (King) R.E. Fr.

Thanakorn Mongantha[1]

NP-P-085

Extraction and Isolation of Bioactive Flavonoids from Mistletoe, Dendrophthoe pentandra (L.) Miq., growing on Mangifera caloneura Kurz.

Sakchai Hongthong[1], Naowarat Kongkum[2], Sariyarach Thanasansurapong[3], Chakkree Lekklar[4], Chanchai Sukkum[5], and Nakin Surapanich[6]

OM - Organic Synthesis and Medicinal Chemistry

OM-P-002

Design, Synthesis and Computational Studies of Quinoline derivatives as potent HIV-1 non-nucleoside reverse transcriptase inhibitors and anticancer agents

Arthit Makarasen[1], Suwicha Patnin[1], Pongsit Vijitphan[1], Apisara Baicharoen[1], Mayuso Kuno[2], Apinya Chaivisuthangkura[2], Nanthawan Reukngam[2], Panita Khlaychan[2], Pakamas Intachote[3], Busakorn Saimanee[3], Suchada Sengsai[3], and Supanna Techasakul[3]

OM-P-003

Design, Synthesis, Pharmacological evaluation and Molecular Docking Study of 2-Phenylamino-4-Phenoxyquinoline Derivatives as Potent HIV-1 Non-Nucleoside Reverse Transcriptase Inhibitors

Suwicha Patnin[1], Arthit Makarasen[1], Pongsit Vijitphan[1], Apisara Baicharoen[1], Mayuso Kuno[2], Nanthawan Reukngam[2], Panita Khlaychan[2], and Supanna Techasakul[2]

OM-P-005

Preparation of 99mTc-PSMA as a radiopharmaceutical for diagnosis of prostate cancer

Boon-Uma Jowanaridhi[1], and Chotiwid Wiriyachailerd[1]

OM-P-006

Gallium-68 radiopharmaceutical for positron emission tomography imaging of tumor-induced angiogenesis

Wiranee Sriwiang[1], Thanate Duangta[1], and Piriya Kaeopookum[1]

OM-P-008

Development of C–H functionalization of quinoxalin-2(1H)-ones and quinolin-2(1H)-ones via photoinduced C–C bond cleavage

Thamonwan Penporn[1], and Dr. Worawat Niwetmarin[1]

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OM-P-009 The application of ortho-alkynylanilines in divergent and selective generation of alkenylated indoles

Sureeporn Ruengsangtongkul[1], Sukit Chonradeenitchakul[2], Charnsak Thongsornkleeb[2], Jumreang Tummatorn[2], and Somsak Ruchirawat[2]

OM-P-015 Asymmetric synthesis of ent-anorisol A and its stereoisomers and confirmation of the absolute configuration of anorisol A isolated from Anogeissus rivularis

Rungrawin Chatpreecha[1], Chutima Kuhakarn[1], Pawaret Leowanawat[1], Vichai Reutrakul[1], and Darunee Soorukram[1]

OM-P-016 Michael Addition Using Dialkyldithiocarbamate Salt as Organocatalyst

Qamar Farid[1], Panassilp Authai[1], and Panuwat Padungros[1]

OM-P-018 Low-cost colorimetric and fluorescent dyes derived from biomass hydrogenated cardanol as petroleum markers

Suthikorn Jantra[1], Pimjai Rattanamunee[1], Mongkol Sukwattanasinitt[2], and Sumrit Wacharasindhu[2]

OM-P-019 NMR Study the Stability of DMPBD from rhizomes of Zingiber cassumunar Roxb.: Effects of Storage Conditions, Temperatures, Solvents, and Time

Boonwiset Seaho[1], Wichayasith Inthakusol[1], Wiratchanee Mahavorasirikul[1], Saisuree Prateeptongkum[1], and Nongnaphat Duangdee[1]

OM - Organic Synthesis and Medicinal Chemistry *(con't)*

OM-P-020 Quantitative 1H NMR Spectroscopy Based on Internal /and External Standard PULCON for The Phenylbutanoids Quantity in Zingiber cassumunar Roxb. rhizome.

Chatkamon Lekwongphaiboon[1], Boonwiset Seaho[1], Ngampuk Tayana[2], Wichayasith Inthakusol[2], Sumet Kongkiatpaiboon[2], Saisuree Prateeptongkum[2], and Nongnaphat Duangdee[2]

OM-P-021 Analogs of lapatinib from its fragmented core structure inhibit SARS-CoV-2 main proteases

Adediji Ayomide Olamide[1], Tanatorn Khotavivattana[1], Akeanan Marutakula[1], Siwaporn Boonyasuppayakorn[2], Aphinya Suroengrit[2], Patcharin Wilasluck[3], Peerapon Deetanya[3], Kittikhun Wangkanont[3], Thanyada Rungrotmongkol[4], and Kamonpan Sanachai[5]

OM-P-022 Divergent Synthesis of 3-Pyrrolidin-2-yl-1H-Indoles, Symmetric and Unsymmetric Bis(Indolyl)Methanes (BIMs) through Photocatalyzed Decarboxylative Coupling/Friedel-Crafts Alkylation Reaction

Dr. Patamawadee Silalai[1], and Assoc. Prof. Rungnapha Saeeng[1]

OM-P-024 Phytic acid as a metal-free catalyst for the synthesis of allylamine derivatives

CAN VAN PHAM[1], Lalita Radtanajiravong[2], and Warinthorn Chavasiri[2]

OM-P-025 Synthesis of biscoumarin derivatives as α-glucosidase inhibitors

Thi-Hong-Truc Phan[1], and Warinthorn Chavasiri[1]

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OM-P-026 Synthesis and antioxidant activity of coumarin-chalcone derivatives

Supaporn Khammuang[1], Kingkaew Nakhamsri[1], Wichayasith Inthakusol[1], Ngampuk Tayana[1], Nongnaphat Duangdee[1], and Saisuree prateeptongkum[1]

OM-P-028 Synthesis and structure modification of marine natural products caerulomycins

Jesada Maneewong[1], Natthiya Saehlim[1], and Rungnapha Saeeng[1]

OM-P-029 PEGylated Aza-BODIPY Nanoparticles for Photothermal Therapy

Sastiya Kampaengsri[1], Kantapat Chansaenpak[2], and Anyanee Kamkaew[2]

OM-P-030 Synthesis of novel 19-substitued imine-12-amino andrographolide-3-one derivatives

Teerapich Kasemsuk[1], and Rungnapha Saeeng[1]

OM-P-031 Synthesis of C-19 Silyl Dithiocarbamate Epoxy Andrographolide Analogues

Pansachon Intamalee[1], Patcharee Arsakhant[1], and Rungnapha Saeeng[1]

OM-P-032 Vinyl sulfones as a small molecule "OFF-ON" fluorescent probes for detection of viscosity and Cancer Cell imaging

Onnicha Khaikate[1], Thitima Pewklang[1], Kantapat Chansaenpak[2], and Anyanee Kamkaew[2]

OM-P-033 Synthesis of Tetramethylene Tethered Bis[N(N'butylimidazol-2-ylidene)] NHeterocyclic Carbene Using as Organocatalyst in Benzoin Condensation

Sarocha Duangdesh[1]

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OM-P-034 Aza-BODIPYs bearing Tetraphenylethylene with aggregation-induced emission

Sirimongkon Aryamueang[1], Kantapat Chansaenpak[2], and Anyanee Kamkaew[2]

OM-P-036 Acryloylated Chalcone Derivatives Exhibiting Potent Anticancer Activity on Human Colorectal Carcinoma: Synthesis, Cytotoxicity and Molecular Simulation

Nopawit Khamto[1], Kraikrit Utama[2], Atchara Janthong[2], Suriya Tatieng[3], Padchanee Sangthong[3], Vachira Choommongkol[4], and Puttinan Meepowpan[4]

OM-P-037 Synthesis of 3-Aminopiperlongumine

Phongsathon Khlongkhlaeo[1], and Punlop Kuntiyong[1]

OM-P-038 Novel Quinoline-based Fluorescent Chemosensors for Highly Selective and Sensitive Detection of Cu(II) Ion

Yuttana Senpradit[1], and Prof. Dr. Mongkol Sukwattanasinitt[1]

OM-P-039 NaI-mediated electrochemical desulfurization of thioureas into guanidines in aqueous media

Thao Nguyen Thanh Huynh[1], Khuyen Thu Nguyen[1], Mongkol Sukwattanasinitt[1], and Sumrit Wacharasindhu[1]

OM-P-041 Synthesis of Anticancer Bauhinoxepins C and D

Intouch Rakchaya[1], and Paiboon Ngernmeesri[1]

OM-P-042 Syntheses of Pinostrobin Derivatives and Their Inhibitory Activities of Cystic fibrosis transmembrane conductance regulator (CFTR)

Suphat Chantawarin[1], Sunhapas Soodvilai[1], and Chutima Jiarpinitnun[1]

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OM-P-043 Synthesis of spiro[isoindoline-1,3'-pyrrolidine-2',5'-dione] via palladium-catalyzed intramolecular alpha-arylation

Ittiphat Klayparn[1], and Punlop Kuntiyong[1]

OM-P-044 Synthesis of 2-(6-bromopiperonyl)pyrrolidine via diastereoselective aza-Sakurai reaction

Wichita Kheakwanwong[1], and Punlop Kuntiyong[1]

OM-P-046 Copper(II) complexes of quinoline-based ligands for efficient photoredox catalysis of atom transfer radical addition (ATRA) reaction

Pawittra Chaibuth[1], Oliver Reiser[2], and Mongkol Sukwattanasinitt[2]

OM-P-047 Synthesis and Anticancer Evaluation of Indolo[1,2-a]quinoline Derivatives

Kredmanee Yimnoi[1], and Paiboon Ngernmeesri[1]

OM-P-048 The synthesis of unsymmetrical aniline-based triarylmethanes catalyzed by acidic ionic liquid

Pichamon Masnguluem[1], Nipaporn Ponpao[1], and Uthaiwan Sirion[1]

OM-P-054 Microwave-Assisted Copper-catalyzed Synthesis of Quinazolinones from 2-Aminobenzamides and Alcohols

Jira Jongcharoenkamol[1], and Sutthichat Kerdphon[2]

OM-P-055 Synthesis of photosensitizers with aggregation-induced emission properties

Satawat Ngampattrapan[1], and Worawan Bhanthumnavin[1]

PC - Polymer Chemistry and Bio-based materials

PC-P-003 Electrospinning of poly-L-lactic acid for air filter application

SOMPIT WANWONG[1]

PC-P-004 Extending shelf life of fresh minced pork using carboxymethylcellulose films loaded with curcumin and galanga extracts

Wachirintra Khamphan[1], Pongsathorn Sroisroemsap[1], and Supranee Kaewpirom[1]

PC-P-006 Effectiveness of carboxymethylcellulose coatings with essential oil on shelf-life of fresh tomatoes

Nuttawut Butprom[1], Teeranan Nongnual[1], and Supranee Kaewpirom[1]

PC-P-009 Preparation and characterization of carboxymethyl cellulose-based film containing aloe vera for food packaging applications

Orathai Nabnain[1], Pitchaporni Chaowalit[1], Tanwalai Chatkumpjunjalearn[1], and Wilaiporn Kraisuwan[1]

PC-P-010 SYNTHESIS AND CHARATERIZATION OF Ag3O4/ POLYANILINE COMPOSITE FOR CAPACITOR APPLICATION

Panisa Tayoonrum[1], and Nophawan Paradee[1]

PC-P-011 Synthesis and characterization of silver-gold immobilized poly(methyl methacrylate)/polyethyleneimine hybrid particles

Veerapat Ramanee[1], and Panya Sunintaboon[1]

PC-P-014 Properties of wheat gluten/cationic starch biofoam

ATHITI NAMKHAW[1], and Sudsiri Hemsri[1]

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PC-P-018 Synthesis and characterization of lignin-modified acrylate adhesive

Sutawee Jomrieng[1], and Duangamol Tungasamita[1]

PC-P-020 Hysteresis Measurement of Various Engineering-Shape 3D-Models Printed from House-made LDPE-Teak Composite Filament

Kiattisak Sophon[1], Nattakarn Hongsriphan[1], and Pajaera Patanathabutr[1]

PC-P-021 Functionalized low molecular-weight natural rubber latex via photochemical reaction by using TiO2 -coated-hollow glass bead and properties of rubber compounding

Sirikanya Nuchong[1], Apisara Sillapasuwan[1], and Jitladda Sakdapipanich[1]

PC-P-022 A new nontoxic preservative for concentrated natural rubber latex and the properties of the latex-dipped films

Apisara Sillapasuwan[1], Porntip Rojruthai[2], and Jitladda Sakdapipanich[2]

PC-P-023 Stability of water-in-oil high internal phase emulsion in a presence of single-surfactant and double-surfactant

Patthamaphan Sungsiri[1], and Wanchai Lerdwijitjarud[1]

PC-P-024 Preparation and characterization of porous polymer membrane from kappa-iota carrageenan blend

Thitikarn[1], and Nophawan[1]

PC-P-028 Comparing The Efficiency of Sodium Dodecyl Sulfate (SDS) and Ammonium Laurate (AL) Used in Preparation of Deproteinized Natural Rubber Latex

Phattharawadi Saekhow[1], Porntip Rojruthai[2], and Jitladda Sakdapipanich[2]

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PC-P-029

HIGHTLY ACTIVE CATALYTIC IN BULK RING-OPENING POLYMERIZATION OF ε-CAPROLACTONE USING ALKYL/ARYL-TETHERED BIS[N-(N'-ALKYLIMIDAZOL-2-YLIDENE)] N-HETEROCYCLIC CARBENES AS CATALYSTS : SYNTHESIS AND DFT MECHANISTIC STUDY

Nathaporn Cheechana[1], Natthapol Akkravijitkul[1], Puracheth Rithchumpon[1], Assist. Prof. Thiti Janpirom[1], Assist. Prof. Dr. Wanich Limwanich[2], Assoc. Prof. Dr. Winita Punyodom[2], Assist. Prof. Dr. Praput Thavornyutikarn[2], and Assoc. Prof. Dr. Puttinan Meepowpan[2]

PC-P-031

Development of Biodegradable Particulate Filters Incorporating Proteinase K in Poly(L-lactic acid) by Emulsion Electrospinning

Itchaya Thinnakorn[1], Jutamas Kongsuk[2], Thannaphat Jenvoraphot[2], Donraporn Daranarong[3], Montira Sriyai[3], Robert Molloy[4], and Winita Punyodom[5]

PC-P-032

Synthesis of starch-based hydrogel functionalized with ZnO particles for effective wastewater treatment

Piyawan Kongseng[1], Pongsaton Amornpitoksuk[1], and Sirinya Chantarak[1]

PC-P-033

Preliminary study on the quality inspection of plastic products manufactured by injection molding using deep learning technique

Niti Kooyhuaytia[1], and Supranee Kaewpirom[1]

PC-P-034

FABRICATION AND CHARATERIZATION OF ALKALI LIGNIN-KAPPA FILM FOR ANTIBACTERIAL MATERIAL

KAMONKORN SRIPAK[1], Nophawan Paradee[1], and Sarttrawut Tulaphol[1]

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PC-P-035 TA-AgNPs/Alginate hydrogel and its potential application as a promising antibiofilm material against polymicrobial wound biofilms using a unique biofilm flow model

Oranee Srichaiyapol[1], Sarah Elizabeth Maddocks[2], Saengrawee Thammawithan[2], and Rina Patramanon[2]

PC-P-040 ALL-CELLULOSE COMPOSITE FROM PRE-CONSUMER COTTON TEXTILE WASTE: ITS POTENTIAL AS BUILDING MATERIALS

Anuphong[1]

PC-P-041 Fabrication of biodegradable composite hydrogels based on cassava starch (Cst)-grafted-polyacrylamide (PAM)/natural rubber (NR)/Montmorillonite (MMT) as coating membrane for slow-release fertilizers

Punnapat Jumpapaeng[1], and Sayant Saengsuwan[1]

PC-P-042 Influence of carbon nanotube on reinforcement effect and relaxation of natural rubbers

ANOMA THITITHAMMAWONG[1]

PC-P-043 Effect of industrial rubber foam waste in rubber vulcanizates

ANOMA THITITHAMMAWONG[1], and Karlil Amin[1]

PC-P-044 The application of chitosan material in forensic science: The development of latent fingerprints

Nopparat Plucktaveesak[1], and Jidabha Apiluk[1]

PC-P-045 Floating of carbon black-filled polyurethane foam based on palm oil polyol

Nattapon Uthaipan[1], Thansiri Kongprabat[2], Thawanrat Chaisit[2], Anuwat Saetung[3], and Nitinart Saetung[3]

PC - Polymer Chemistry and Bio-based materials *(con't)*

PC-P-047 Fabrication of hybrid nanocomposite hydrogels based on glycidyl methacrylate modified natural rubber/cassava starch/ montmorillonite as novel efficient adsorbents for the removal of methylene blue dyes from aqueous solutions

Wilawan Amornsawet[1], Kusuma Boonpalak[1], and Sayant Saengsuwan[1]

PC-P-048 Fabrication and characterization of porous hydrogel scaffold based on poly(2-hydroxyethyl methacrylate)/silk sericin for skin tissue regeneration

Sudarat Promkrainit[1], and Sukunya Ross[2]

PC-P-050 Effect of vinyl acetate/ethylene copolymer on properties of TPS/PLA blend at high starch content

Arisa Jaiyu[1], Julaluk Phunnoi[1], Passakorn Sueprasit[1], Borwon Narupai[1], and Nattaporn Chutichairattanaphum[1]

PC-P-051 Improvement of mechanical properties of pineapple leaves with water hyacinth for paper packaging

malinee Leekrajang[1], Nattaporn Chutichairattanaphum[1], Borwon Narupai[1], and Teerakorn Kongkaew[1]

PC-P-052 Green Electrospun Nanofibers of Ethyl Cellulose for Use as Air Filters

Sarat Nudchapong[1]

PC-P-053 Preparation, Characterization, and Antimicrobial Properties of Linoleic acid - Grafted Chitosan Coating on Cellulose Acetate Nanofibers

Jate Panichpakdee[1]

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PC-P-054 The effect of nucleating agents on morphology and thermal properties of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) composites

Borwon Narupai[1], Arisa Jaiyu[1], Julaluk Phunnoi[1], Passakorn Sueprasit[1], Malinee leekrajang[1], and Nattaporn Chutichairattanaphum[1]

PC-P-056 Hemp Core/Poly(lactic acid) Composite Film: Effect of Surface Treatment and Hemp Size

Supatra Ptatumshat[1], Nutthakan Sutta[1], and Yeewa Sukkerd[1]

PC-P-058 Synthesis and characterization of temperature and pH-responsive injectable hydrogels based on chitosan-graft-(mPEG-block-PCL) copolymers

Pawitchaya Madech[1], Kiattikhun Manokruang[1], and Winita Punyodom[1]

PC-P-059 In Vitro Degradation Study of Poly(L-lactide-co-e-caprolactone) -Polypeptide Barrier Membrane for Bone Regeneration

Donraporn Daranarong[1], Thannaphat Jenvoraphot[2], Chayarop Supanchart[3], and Winita Punyodom[4]

PT - Physical and Theoretical Chemistry

PT-P-003 Molecular docking and ONIOM study of 2-phenylamino-4-phenoxyquinoline derivatives against main protease of SARS-CoV2

Apisara Baicharoen[1], Suwicha Patnin[1], Arthit Makarasen[1], Pongsit Vijitphan[1], Apinya Chaivisuthangkura[2], Mayuso Kuno[2], and Supanna Techasakul[2]

PT-P-010 Molecular assembly of hyaluronic acid nanoparticles by molecular dynamics simulations

Pisit Lerttanakij[1], and Pornthep Sompornpisut[1]

PT-P-011 Anionic Effects on Zinc Ion Transport and Solvation in Aqueous Zinc-Ion Batteries

Manaswee Suttipong[1]

PT-P-012 Molecular Dynamics Investigation into Lithium Ion Solvation and Transport Properties in Mixed Organic Solvents

Siriporn Teeraburanapong[1]

PT-P-014 Binding Study between the Main protease (Mpro) of the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) and Andrographolide by Computational Methods

Aunlika Chimprasit[1], Supa Hannongbua[1], and Patchreenart Saparpakorn[1]

PT-P-015 Kinetic study on the thermal degradation of anthocyanin extract from Thai dark purple glutinous rice (Oryza sativa L.)

Thamonwan Meephun[1], Warayuth Sajomsang[2], Pattarapond Gonil[2], and Montra Chairat[2]

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PT - Physical and Theoretical Chemistry *(con't)*

PT-P-016	CO2 hydrogenation to formic acid by single-atom Cu anchored on MOF-808(Zr): A DFT Study Nawarat Kusonjariyakun[1], Jirapat Santatiwongchai[2], Warot Chotpatiwetchkul[2], and Sarawoot Impeng[2]
PT-P-017	Theoretical Investigation on Carotenoids-Chlorophyll c Light-Harvesting Complexes, based on DFT calculations. Prin Tadawattana[1], Patchareenart Sapparpakorn[1], Songwut Suramitr[1], and Supa Hannongbua[1]
PT-P-020	Synergetic effect of diatomic metal–boron embedded in C2N monolayer promotes highly effective electroreduction of N2 and CO2 to urea Nuttapon Yodsin[1], Poobadin Mano[1], Kaito Takahashi[2], and Supawadee Namuangruk[2]
PT-P-021	3D-QSAR, MD simulations, and MM-PBSA calculations on the pyrimethamine derivatives as inhibitors of P. falciparum dihydrofolate reductase Sasipha Seetin[1], Patchreenart Saparpakorn[1], Jarunee Vanichtanankul[2], Sumalee Kamchonwongpaisan[2], and Supa Hannongbua[2]
PT-P-022	Adsorption of Glyphosate on Coordinatively Unsaturated Metal−Organic Frameworks: Insights from DFT Calculations Prissana Sanarom[1]
PT-P-027	The interaction of arsenous acid over gold cluster: A DFT study Phattharakorn Pakaiphuek[1], Rommanee Arunruwiwat[1], Tipawan Rungsawang[1], Piti Treesukol[1], and Bundet Boekfa[1]

PT - Physical and Theoretical Chemistry *(con't)*

PT-P-028 The structure and NMR spectra of dihydroxy-4-methylcoumarin: A combined theoretical and experimental study

Churarat Wansang[1], Piti Treesukul[1], Nongpanga Jarussophon[1], and Bundet Boekfa[1]

PT-P-029 A stability prediction of a 32-electron principle of [MC28]x (M = Ce, Pr+, Nd2+, Pm3+, Sm4+, Th, Pa+, U2+, Np3+ and Pu4+) using theoretical study

Kanissorn Kiratipongvoot[1], and Sarote Boonseng[1]

PT-P-031 Descriptor for Predicting Transition-State Energies of Hexane Cracking over Acidic Zeolites

Saharat Phongsopar[1]

PT-P-035 A theoretical investigation on electronic transition of PhOLEDs relevant fluorophenyl-substituted cyclometalated Platinum(II) complexes

Wilaiwan Rosungnoen[1], and Songwut Suramitr[2]

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Wishanee Matthayom[1], Ekkachai Martwong[1], Wilaiwan Rosungnoen[2], and Songwut Suramitr[2]

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pimjai pimbaotham[1], Siriporn Jungsuttiwong[1], and Chompoonut Rungnim[2]

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Wassana Mongkonkan[1], Supawadee Namuangruk[2], and Siriporn Jungsuttiwong[2]

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SC-P-002 Property of hydrogen gas

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SC-P-003 Electrolyte and non-electrolyte solutions

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SC-P-010 Preparation of asetylena from calsium carbida using small scale chemistry

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SC-P-011 Investigation of temperature effect on equilibrium

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SC-P-014 Oxidation reduction reaction by small scale chemistry

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SC-P-015 Green experiment on rate of reaction experiment

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SC-P-016 The oxidation state of manganese experiment

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SC-P-017 Electroplating process with small scale

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SC-P-018 A pop sound from hydrogen gas

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SC-P-019 Distillation flask setup from locally available materials

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SC-P-020 Determination of factors affecting rate of reaction

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SC-P-021 Handy preparation of carbon dioxide gas to observe fire extinguishing property

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SC-P-022 Electroplating of copper on iron pin

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SC-P-023 Preparation of carbon dioxide gas

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SC-P-024 Separation of volatile and non-volatile mixture (camphor and sand) using sublimation process

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SC-P-025 Generation of H_2 gas from the reaction of acid with metal

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SC-P-026 Preparation of carbon dioxide gas using small scale technique

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SC-P-027 Investigate the galvanic cell of copper and iron

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SC-P-028 Study of the borax test kits produced from various types of natural Thai herbs

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SC-P-029 Acid-base analysis by using a pH wheel

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SC-P-030 Small-scale experiment on factors affecting reaction rates

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SC-P-031 Small-scale chemistry laboratory to study acid-base reactions and the reactions of acids and bases with metals

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SC-P-032 Extraction of natural dyes for staining plant tissues

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SC-P-034 Small-scale synthesis and qualitative analysis of biodiesel

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SC-P-035 A butterfly pea cotton swab used as a pH indicator

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SC-P-036 An aquarium air pump used to improve students' understanding in chemistry topics

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SC-P-037 The determination of moles and volumes of gases by small-scale

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SC-P-038 Determination of empirical formula of hydrated compound in chemistry classroom

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SC-P-039 Chemistry classroom; investigation of some hydrocarbons properties

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SC-P-040 The electrochemistry practice sets for high school experiment

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SC-P-041 Small scale waste treatment

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SC-P-042 Colorless betadine: the chemical reaction of iodine and ascorbic acid

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SC-P-043 Dry and wet concept ionic experiment

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SC-P-044 Electrochemical cell from wood vinegar with simple tools

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SC-P-045 Small-scale titration with mini stirrer, SAMSEN pH detector and mobile phone application

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SC-P-046 Pretreatment of fat from household wastewater using plant fibers

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SC-P-047 Study of the precipitation of halogen using salted paper printing process

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SC-P-048 Determination of copper (II) ion in $CuSO_4$ solution using electrochemistry and titration methods

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SC-P-049 Comprehensive learning through paper-based sensors using green synthesized AuNPs for glucose detection

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SC-P-050 Determination of rate law and factors that affect rate of iodine clock reaction

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SC-P-051

Development of a small-scale distillation

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SC-P-052

Colorimetric analysis of acidity of anthocyanin extracted from Riceberry using smartphone application

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SC-P-053

Solubility of styrofoam in oils extracted from tangerine peels, pomelo peels, bergamot peels and lime peels

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SC-P-054

Identification of halide ions

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SC-P-055

Small-scale determination of ionic reaction

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SC-P-056 Oxidation of potassium iodide by hydrogen peroxide

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SC-P-057 Properties of acid and bases

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SC-P-058 Determination of electrolyte and non-electrolyte solutions

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SC-P-059 Study of protein denaturation using small scale technique

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