ICCE 2024
Pattaya, THAILAND

The 27th IUPAC International Conference on Chemistry Education

Royal Cliff Grand Hotel, Pattaya, Thailand

15-19 July, 2024

"The Power of Chemistry Education for Advancing SDGs"

Abstract Book



Welcome Message from Chair of 27th IUPAC International Conference on Chemistry Education (ICCE2024)



Dear Colleagues

On behalf of the organizing committee of the 27th IUPAC International Conference on Chemistry Education (ICCE2024), it is my great pleasure to invite you to participate in ICCE2024 during July 15-19, 2024, in Pattaya, THAILAND - The land of smile and a hub of ASEAN.

With the theme of this conference, "Power of Chemistry Education for Advancing SDGs", it aims to provide a platform for educators, practitioners, teachers, chemists, and scientists around the world to interface with pioneers & leaders in sustainable development. It is the moment for us to learn from the present and past while we are charting our future.

We strongly believe that ICCE2024 will create a remarkable impact and legacy across the region and the world in tackling the global challenges in chemistry education and paving our way to achieve Sustainable Development Goals.

We are looking forward to giving a warm welcome to you, your family, and colleagues at ICCE2024 in Pattaya, a city at the center of Thailand's Eastern Economic Corridor which is full of life and excitement. We hope that you will find the conference both enjoyable and valuable. We thank you in advance for participating and contributing to the success of the event. Please mark your calendar on July 15-19, 2024.

With best wishes

Prof. Dr. Supawan Tantayanon
Chair, 27th IUPAC International Conference on Chemistry Education (ICCE2024)

Welcome Message from President of Chemical Society of Thailand



It is our pleasure to invite you to the **27th International Conference on Chemistry Education (ICCE 2024)** which will be held at **Royal Cliff Grand Hotel, Pattaya, Chon Buri, Thailand** during **July 15-19, 2024**. The scientific program will extend to full five-days program under the theme **"Power of Chemistry Education for Advancing SDGs"**. Not only overseas experts are invited to give their lectures during the conference, we also create several sessions to cover the latest innovation and knowledge. With the state-of-the-art lectures as well as Free Paper presentation, we expect the highest satisfaction from all participants.

This conference will provide a wonderful event for sharing and refreshing your knowledge and we wish you can enjoy this familiar place, meet your old friends and have a good time together in Pattaya.
Look forward to seeing you, July 15-19, 2024

Prof. Dr. Vudhichai Parasuk
President of Chemical Society of Thailand

Program at a Glance



Time/Date	15 Jul 2024		16 Jul 2024				17 Jul 2024			18 Jul 2024				19 Jul 2024		
	Registration 7.30-16.00		Registration 8.00-16.00				Registration 8.00-14.00			Registration 8.00-16.00				Registration 8.00-14.00		
9.00-10.40	Parallel Sessions	Symposium A	Parallel Sessions	Symposium A	Symposium B	Symposium D	Parallel Sessions	Symposium D	Symposium E	Parallel Sessions	Symposium C	Symposium F	Workshop D	Parallel Sessions	Workshop E	Workshop F
10.40-11.00	Break		Break				Break			Break				Break		
11.00-12.00	Parallel Sessions	Symposium A	Parallel Sessions	Symposium A	Symposium B	Symposium D	Parallel Sessions	Symposium D	Symposium E	Parallel Sessions	Symposium C	Symposium F	Workshop D	Parallel Sessions	Workshop E	Workshop F
12.00-12.40										Plenary 4 (12.00-12.40)						
12.40-14.00	Lunch		Lunch				Lunch			Lunch				Lunch		
14.00-14.40	Parallel Sessions	Symposium A	Parallel Sessions	Workshop A	Symposium B	Symposium E	Excursion			Parallel Sessions	Symposium C	Symposium F	Workshop D	Closing		
14.40-15.40																
15.40-16.00	Break		Break							Break						
16.00-17.00	Opening		Parallel Sessions	Workshop A	Symposium B	Symposium E				Parallel Sessions	Symposium C	Symposium F	Workshop D			
17.00-17.40	Plenary 1		Plenary 3 (17.20-18.00)							Special Event 2 (Panel Discussion) (17.20-19.00)						
17.40-18.20	Plenary 2															
18.20-21.00	Welcome Reception		Poster Presentation Section1 (18.00-19.30) Poster Presentation Section 2 / Special Event 1 (19.30-21.00) Cocktail Reception							Conference Banquet (19.00-21.00)						

ICCE 2024 Program Themes

1. Chemistry Education in Informal Education and Life-long Learning Context
2. Redesigning Chemistry Laboratory Teaching
3. Innovative Technology for Chemistry Education
4. Chemistry and Science Teacher Education and Continuous Professional Development
5. Chemistry and Chemical Science Education for Environmental and Social Sustainability
6. Policy, Reform, and Quality Assurance in Chemistry Education
7. Ethics, Diversity, Equity and Inclusion in Chemistry Education
8. Emerging Educational Trends in Chemistry in the 21st Century

Symposia

Symposium A: The 12th International Symposium on Microscale Chemistry (12ISMC)

Symposium B: Modeling-Based Instruction and Assessment for Chemistry Education

Symposium C: Connecting Competency-based Chemistry Education and the Challenge of Sustainable Development

Symposium D: Advancing Chemical Safety and Security Education

Symposium E: (Join Education and Industry Symposium) System Thinking in Chemistry for Sustainability

Symposium F: Green and sustainable chemistry in the Chemistry Curriculum : Advances and Models

Table of Contents

	Page
Welcome Messages…….....	I
Conference Venue and Floor Plan…….……	III
Program at Glance…….……	V
Table of Contents…….……..	VI
The International Advisory Board…….….……	VII
Organizing Committee…….…….….	VII
Scientific Committee……...….…….	VIII
Abstracts of Plenary Lectures …….….…….……	1
Abstracts of Keynote Speakers …….…….……...……	6
Abstracts of Invited Speaker …….…….	17
Abstracts of Oral Presentations …….…….....	56
Abstracts of Poster Presentations …….……...	202
Sponsors…….……	390

The International Advisory Board

Nicole	Moreau	France
KhunYing Sumonta	Promboon	Thailand
Javier	Martinez	Spain
Marietjie	Potgieter	South Africa
Amy	Cannon	USA
Howard	Alper	Canada
Solange	Locatelli	Brazil

Organizing Committee

International Advisory Committee	Prof. Nicole Moreau, France
	KhunYing Sumonta Promboon, thailand
	Prof. Javier Martinez, Spain
	Prof. Marietjie Potgieter, South Africa
	Prof. Amy Cannon, USA
	Prof. Howard Alper, Canada
	Prof. Solange Locatelli, Brazil
Conference Chair	Prof. Dr.Supawan Tantayanon
General Secretary	Assoc. Prof. Dr.Supakorn Boonyuen
	Asst. Prof. Dr.Pumidech Puthongkham
Assistant Secretary General	Asst. Prof. Dr.Duangruthai Sridaeng
	Asst. Prof. Dr.Singto Sakulkhaemaruethai
Registration	Asst. Prof. Boonnak Sukhummek
Treasurer	Asst. Prof. Boonnak Sukhummek
Scientific Program	Assoc. Prof. Dr.Taweetham Limpanuparb
Sponsor & Exhibition	Prof. Dr.Supa Hannongbua
Protocol & Social Event	Assoc. Prof. Narumol Kreua-ongarjnukool
Facility Management	Assoc. Prof.Dr.Uthaiwan Sirion
	Asst. Prof. Dr.Piyaporn Na Nongkhai
Public Relations	Assoc. Prof. Dr.Suchada Chantrapromma
	Dr.Orasa Onjun

Scientific Committee

Assoc. Prof. Dr.Taweetham Limpanuparb	(Chair of Scientific Committee), Australia and Thailand
Assoc. Prof. Dr.Christopher Smith	Australia and Thailand
Dr. Seamus Delaney	Australia
Assoc. Prof. Dr. Junming Ho	Australia and Singapore
Prof. Santiago Sandi-Urena	Costa Rica and USA
Prof. Régis Réau	France
Prof. Claus Bolte	Germany
Prof. Hendra Y. Agustian	Denmark
Dr. Anggiyani Ratnaningtyas Eka Nugraheni	Indonesia
Prof. Ron Blonder	Israel
Dr. Debora Marchak	Israel
Prof. Zuriati Zakaria	Malaysia
Prof. Jorge G. Ibanez	Mexico
Prof. Anna Garden	New Zealand
Prof. Edwehna Elinore S. Paderna	Philippines
Dr. Fung Fun Man	Singapore
Prof. Emerita Mei-Hung Chiu	Taiwan
Dr. Suranan Anantachaisilp	Thailand
Assoc. Prof. Dr. Chatree Faikhamta	Thailand
Assoc. Prof .Dr. Ekasith Somsook	Thailand
Prof. Niwat Srisawasdi	Thailand
Assoc. Prof. Dr. Nuttee Suree	Thailand
Assoc. Prof. Dr. Saksri Supasorn	Thailand
Prof. Judith Bennett	UK
Prof. Glenn Hurst	UK
Prof. Stephen Matlin	UK
Dr. Christine M Straut Langlinais	USA
Prof. Kenneth Doxsee	USA
Prof. Delmar Larsen	USA
Prof. Marcy Towns	USA

CS-P-020

A Bibliometric Analysis on Teachers' Professional Development in Chemistry Education

Mustafa Sözbilir[1,*], Betül Okcu[2], Dilek Teke[1]
[1]*Atatürk University, Kazım Karabekir Faculty of Education, Chemistry Education,25240 Erzurum, Türkiye*
[2]*Atatürk University, Kazım Karabekir Faculty of Education, Science Education, 25240 Erzurum, Türkiye*
[*]*E-mail: sozbilir@atauni.edu.tr*

The power of a country starts with the education of people. Teacher education is very important in developing a knowledgeable society. Changes taking place in today's society are also important in raising educated people, and these thus influence teacher education. Therefore, it is necessary to identify the trends in professional development of chemistry teachers to see the changes in recent years. This research aims to determine the trends and status of chemistry subjects, countries, authors, target audiences, technologies, and pedagogies in papers published in Web of Science (WoS) indexed journals, related to professional development of chemistry teachers in chemistry education research, between the years of 2019-2022. Descriptive and network analyses were carried out using bibliometric analysis of these records. In this research, 168 articles were obtained over this publication period. These articles were analyzed through bibliometric analysis in the Vosviewer programme. As a result of the analysis, it was found that the researches on professional development of chemistry teacher education were mostly conducted in America and that the *Journal of Chemical Education* was the most common source of works on this subject. In addition, it was also seen that studies on general chemistry were most commonly published.