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# **MESSAGE FROM THE PRESIDENT**



2nd Quarter of 2024 – What have we done?

We started 2024 with the following events on 30th March in the first quarter: Forum on Continuous Professional Development (CPD) Programme for Registered Chemists under Chemists Act 1975 (Act 158) & IKM 57th Annual General Meeting

The **Forum** and **57AGM** have now been successfully concluded. At the Forum, we have learned valuable knowledge and knowhow from our architect, engineering and medical colleagues. Subsequently, we establish a CPD Committee under the chairmanship of ChM Dr Yang Farina & ChM Chang Hon Fong to develop a draft CPD programme for further deliberation with our members. As for the AGM, a "new" IKM Council for 2024/2025 is elected to oversee and implement the coming programmes including **ICPAC Mongolia 2024**, **K**<sub>3</sub>**M 2024**, **Malam Kimia 2024** and **IUPAC 2025**. In addition to the above, the **IKM Professional Centre** will be conducting 34 training programmes in 2024. The **IKM LMIC Examinations 2024** will be held in September

with 89 candidates taking part and IKM LMIC Refresher Course 2024 from 13th July to 18th August.

## **CHEMISTS RULES 2024**

Finally, we have got the **Chemists Rules 2024** in place. After 6 long years of formulations and deliberations among IKM, MOSTI Pegawai Undang-Undang (PUU) and the Attormey General's Chamber (AGC), the **Chemists Rules 2024** is finally approved and signed by the Honourable Minister of the Ministry of Science, Technology and Innovation (MOSTI), Yang Berhormat Chang Lih Kang, and published in the government gazette on the 5th day of June 2024. This means that these new Rules will be put into practice immediately.

## PROGRAMME STANDARD FOR CHEMISTRY

Another major development is the adoption of our **Chemistry Programme Standard** for Malaysian universities by the Malaysian Qualification Agency (MQA). This Standard is developed upon a series of discussion and consultation with stakeholders and the Malaysian Qualification Agency (MQA). In accordance with the Chemists Act 1975, this Standard is approved by the Malaysian Qualification Agency (MQA) for accreditation of undergraduate chemistry programmes in Malaysian universities with MQA. IKM will manage the accreditation process including evaluation and assessment of Malaysian undergraduate chemistry programmes applying for accreditation with MQA.

## **IUPAC 2025**

The biggest challenge for IKM in the years to come is **IUPAC 2025**. **IUPAC 2025** comprises the **53rd IUPAC General Assembly (53GA)** and **50th World Chemistry Congress (50WCC)**. We have started some initial work as early as January 2024 with the establishment of the National Organising Committee (NOC) and the International Advisory Board (IAB). By early January 2024, we have appointed Conference Partners Sdn Bhd as the Professional Conference Organiser (PCO) and selected Kuala Lumpur Convention Centre (KLCC) as the venue of IUPAC 2025. At this moment, we are coming out with a "SAVE THE DATES" initiative to be distributed worldwide through the electronic and social media. The website, **iupac2025.org**, is already up, but still need final touches before it is fully operational in middle of July 2024. We are also working on the scientific contents of 50WCC including inviting plenary and keynote lecturers. We are also actively involved in getting sponsors and the Malaysia Convention & Exhibition Bureau (MyCEB) is a DIAMOND sponsor. There are so many things to do!

We need support of all Malaysians, including all IKM members, to make IUPAC 2025 a big success.

**Datuk ChM Dr Soon Ting Kueh** President, Institut Kimia Malaysia Date: 30th June 2024

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# Forum on Continuous Professional Development (CPD) Programme for Registered Chemists under Chemists Act 1975 (Act 158)

On the 30th of March 2024, Institut Kimia Malaysia (IKM) organized a Forum on Continuous Professional Development (CPD) Programme for Registered Chemists Act 1975 (Act 158) to look into various aspects of CPD in hope to implement it in the near future. Representatives from a number of professional boards were invited to share their CPD programmes – Dato' Ar. Azman bin Md Hashim, President of the Board of Architects Malaysia, Dato' Ir. Dr. Che Hassandi bin Abdullah from the Board of Engineers Malaysia, Dr Khairul Hafidz Alkhair bin Khairul Amin from the Malaysian Medical Council and ChM Chang Hon Fong, Honorary Secretary of IKM. The forum attracted 196 participants from various backgrounds and ChM Dr. Yang Farina Abdul Aziz, Vice President of IKM (2024/2025) was the emcee of the session.

# What is CPD and why are there thoughts of implementing it?

CPD refers to the intentional maintenance, development and enhancement of knowledge and skills through engagement in various learning activities encompassing everything from attending a training course or an educational event, pursuing new qualifications, exploring new job aspects, all the way to fostering lifelong learning and career advancement.

In 2023's IKM Forum on "Look Ahead & Moving Forward" aimed to discuss, debate and chart the future directions of IKM; to look into the future and prepare IKM to be "future-ready" and to explore new ways of conducting business to ensure the longevity and success of IKM for the next 50 years and beyond, CPD was one of the topics discussed,





alongside other important topics like (1) membership development, (2) advancing chemical sciences in Malaysia, (3) promoting chemistry education in Malaysia, (4) chemistry in policy making as well as (5) young chemists: opportunities, career and technopreneurship development [1].

Fortunately, there are many potential benefits of implementing CPD in a statutory professional organization like IKM but there are also many aspects of implementation that have to be ironed out – bringing about the importance of gathering more information from other professional bodies within Malaysia.

## What was discussed at the forum?

In his "Welcome Remarks and Introduction to CPD for Registered Chemists", Datuk ChM Dr Soon Ting Kueh, President of IKM (2024/2025) emphasized the need for professionals, especially those who are in the Science and Technology sectors to stay updated with the latest developments due to the continuous creation of new knowledge, development of new skills and techniques, upgrading of equipment and instrumentation, along with new rules, regulations and even legislation. He also highlighted the vision and proposal of implementing Professional Development through CPD Programmes starting 2027 as one of IKM forward moving steps.

The forum was followed by a 20-minute session on "CPD Requirements for Architects in Malaysia" where Dato' Ar.

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Azman briefly introduced the Board of Architects Malaysia before diving deeper into their CPD General Circular 4/2023 [2]. He mentioned that the board imposes on its registered persons to advocate CPD as the responsibility of each individual as stated in the relevant Code of Conduct under the Architects Rules 1996 [3] and went on to talk about the category dependent variation of CPD Credit Points for renewal of yearly registration, whereby for instance, architect would be expected to fulfill a total CPD credit points of 20 whilst architectural technologist would be expected to hit only 8 credits. He also pointed out the unique considerations of CPD points based on age - 60 years of age and above or 70 years of age and above with practice will be expected to attain 50% of CPD credits; 70 years of age and above without practice will be exempted from CPD credit attainments. They also allow CPD credit points to be carried forward to the subsequent year but may only be applied once from the immediate preceding year. He emphasized that the board is very stringent on the number of credits

accumulated, so in the event where there is insufficient credit, the names of the registered persons will be removed from the registers for failure to comply with the conditions. Dato' Ar. Azman also touched on specific requirements of CPD credit points where each registered member has to adhere to, such as, CPD events need to be approved by the board to qualify for credit points, registered members shall only participate in events and/or activities listed and approved by the board, and application for approval of CPD events shall be submitted to the board via MyLAM portal. These specifications bring about aspects to consider when implementing CPD – what kind of events/activities to be included as part of CPD programme, how to submit CPD credits for attainment, procedure for CPD credit points approval, etc.

The floor was later passed on to Dato' Ir. Dr. Che Hassandi where he talked about "CPD Requirements for Professional Engineers in Malaysia". Similarly, he began by introducing



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BEM Circular No. 002 Continuing Professional Development (CPD) Requirements and guided those in attendance through the key takeaways of the document [4]. This includes (1) what constitutes an acceptable CPD activity and the definition of a CPD hour, (2) the 5 types of CPD activities - Formal Education, On Job Learning, Private Study, Conference and Technical Training, Presentation or Publication of Papers and Engineering Service Activities lecturing, Corporate Social such as mentoring, Responsibility (CSR) activities, accreditation visit and service to BEM, IEM committees, etc., (3) annual CPD requirements for Professional Engineer with Practising Certificate (PEPC), for Professional Engineers (PE), for Inspectors of Works (IOW) and for Registered Persons at the age of 65 and above. Note that the weightage and allowable maximum CPD Hours for each of the recognized CPD activities defer from categories to categories. These sharing of CPD details bring about the thoughts of applicability and transferability to the context of IKM and its registered chemists.

Next, Dr. Khairul Hafidz Alkhair shared about "CPD Requirements for Medical Professionals in Malaysia", giving the audience insights of the evolution of CPD from 1994 to 2017 where CPD points became a mandatory requirement for renewal of Annual Practicing Certificate (APC) and all the way through their present implementation. Akin to the previous two professional bodies, he also introduced Medical Act 1971 (Amendment 2012), Medical Regulations and Directive as a point of reference [5]. As he brought the audience's attention to the CPD Point Grading and Point Collection, he shared about the three main platforms – MyCPD, MMA and AMM – each utilized by a different group of medical practitioners. He spent a portion of his talk towards the end of his session, discussing the issues and

challenges faced so that IKM could learn from and address them while planning for theirs. Such practical sharing of the issues and challenges faced bring about the need to lay down the rationale behind CPD implementation and plan accordingly to ensure the longevity of the programme.

Before proceeding with the open forum panel discussion, ChM Chang talked about "CPD Programmes for IKM Registered Chemists" where he showed a roadmap for developing the CPD programme alongside some issues and challenges IKM has to take into account when planning for the implementation. These include (1) legality, whether the current provisions in the Chemists Act is sufficient, (2) acceptance, whether it would lead to resignation of membership, (3) types of programmes, whether to consider catering for various professions within the chemical sciences, (4) tracking and recognition, how could CPD points be tracked and what kind of activities are considered for CPD attainments, (5) supportive environment, how to foster the culture of CPD, (6) financial implications, whether IKM has the necessary resources and infrastructure to implement CPD, etc.

In the open forum panel discussion, all speakers were seated on stage and CPD-related conversations were initiated. Dato' Ir. Dr. Che Hassandi suggested to initiate CPD as soon as possible and to not expect things to be perfect from the beginning, referencing to some of the issues and challenges mentioned by Dr. Khairul Hafidz Alkhair in his presentation. Datuk ChM Dr Soon later took the opportunity to re-emphasize the benefits of CPD such as good networking opportunity when attending CPD events/ activities and how that would be beneficial to the career development of chemists, in addition to being up to date with the advancement of science and technology. Dato' Ar.





Azman was supportive of it as his follow up by saying "it is good to be fit for your work". There were also discussions revolving around leniency of CPD points, systems to monitor and record CPD as well as legal infrastructure, etc.

To conclude, Datuk ChM Dr Soon urged those in attendance to not hastily take a stand in favour of or against the motion of IKM implementing CPD, instead, to give IKM and its committee some time to strategically make plans, so as to provide everyone with a clearer picture before deciding. The forum ended as planned shortly right after.

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Report prepared by, Asst Prof ChM Dr Yvonne Choo Shuen Lann



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# AIR IS MORE THAN WHAT YOU ACTUAL KNOW

Dr Lee Loong Chuen Senior Lecturer Faculty of Health Sciences, Universiti Kebangsaan Malaysia

In the 21<sup>st</sup> century, humans are paying significantly more attention to daily health issues. We are increasingly concerned about our diets, lifestyles, stress levels, and diseases. However, there is one crucial element that we often overlook - the quality of the air we breathe. Breathing is essential to life. On average, an adult inhales 720 litres of fresh air while at rest. But, have we ever considered what is contained in the air that we breathe daily? Due to industrial development and a lack of strict control over exhaust emissions, air pollution is much more severe compared to a few decades ago. To raise awareness among the general population, the World Health Organization (WHO) has published a book titled "Global Air Quality Guidelines". The purpose of this book is to provide health-based air quality guideline levels.

Air pollution, listed as one of the top five environmental concerns, has been the subject of extensive research and studies to understand its detrimental impacts on the world. However, this article will not delve into these impacts; instead, it will focus on potential solutions to this issue. The World Health Organization (WHO) identifies key air pollutants, which include particulate matter (PM2.5, PM10), ozone ( $O_3$ ), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), and carbon monoxide (CO). The question is, how can we solve this issue and protect the people in the affected areas? The most straightforward approach would be to minimize or eliminate emissions. However, this is not always practical under certain circumstances. Therefore, we need to improve air quality from the perspective of air filtration.

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The figure above presents a basic schematic diagram of a general air filtration process. This process can be applied to various areas such as the ambient air inlet (make-up air handler, MUA), recirculation or return air handlers (RAH), and the top of cleanroom ceiling fan filter units (FFU), among others. The design of the air filtration system is dependent on the actual situation. Factors that need to be considered include the size of the target particles, the concentration of contaminants, the airflow of the system, customer requirements, application, installation space, and other relevant factors.

The concept of particle filtration is relatively straightforward. The selection of a filter is always related to the size of the target particles, which are typically microsized and above, and the efficiency that one wants to achieve. This starts from primary and secondary filters to



Figure 1 Schematic Diagram for General Air Filtration Process



Figure 2 Relative Molecular Size of Particles

HEPA/ULPA filters. On the other hand, to handle molecules in nano size and below, gas phase filtration takes place. Typically, there are three different mechanisms applied in gas phase filtration: physic-sorption, chemical adsorption, and ion exchange. Among them, adsorption technology has been recognized as an efficient and economical control strategy because it has the potential to recover and reuse both the adsorbent and the adsorbate. Due to their large specific surface area, rich porous structure, and high adsorption capacity, carbonaceous adsorbents are widely used in gas filtration, especially with respect to VOC treatment and recovery.

Physic-sorption is the simplest approach, which attaches the target substance to the surface as a result of hydrogen bonding, van der Waals forces, and electrostatic forces. A typical example used in air filtration is Activated Carbon (AC), a biomass that contains cellulose, hemicellulose, and lignin and is activated via pyrolysis techniques. Its performance depends on the number of macropores ( $\geq$ 50nm), mesopores (2–50nm), and micropores ( $\leq$ 2nm) of the Activated Carbon (AC). On the other hand, chemisorption is a type of filtration achieved by substantial sharing of electrons between the surface of the adsorbent and the adsorbate to create a covalent or ionic bond. The chemical reaction that occurs can be redox reactions or neutralization, and the materials used in air filtration can be

Impregnated Activated Carbon (IAC) or Activated Alumina (AA). The last mechanism is ion exchange, which is a reversible chemical reaction wherein an ion from the air is exchanged for a similarly charged ion attached to an immobile solid particle, for instance, inorganic zeolites or organic resins (synthetically produced).

In gas phase filtration, the chemical behaviours of targeting contaminants, their concentration, the synergy effects between contaminants, and the purpose that one wishes to achieve through air filtration play a crucial role in filtration method selection. Appropriate air filtration can not only optimize indoor air quality (IAQ) and minimize human exposure to harmful contaminants, but it can also protect our valuable products, thereby creating greater value for organizations.

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## IUPAC Global Women Breakfast 2024 (GWB2024): Catalyzing Diversity in Science

Assoc Prof ChM Dr Fatimah Salim, Universiti Teknologi MARA Assoc Prof ChM Dr Hooi Ling Lee, Universiti Sains Malaysia

The IUPAC Global Women Breakfast (GWB) is a alobal initiative orchestrated by the International Union of Pure and Applied Chemistry (IUPAC) to honor and advocate for the invaluable contributions of women in chemistry and related scientific domains. This annual gathering aims to cultivate networking avenues, mentorship opportunities, and dialogues centered on gender equity and diversity within the scientific sphere. Across the globe, simultaneous breakfast gatherings are convened under the auspices of IUPAC GWB, fostering collaboration, solidarity, and empowerment among female scientists at every career juncture. By spotlighting the triumphs and tribulations of women in chemistry, this event becomes a pivotal instrument in advancing gender parity and inclusivity across the scientific landscape.

The theme of "Catalyzing Diversity in Science" for GWB2024 serves to unite not only women chemists but also participants hailing from diverse

scientific disciplines. In a historic move, the Institute of Chemistry Malaysia (IKM) has graciously lent its support to GWB2024@Malaysia by providing mini-grants to seven esteemed academic institutions, Universiti Sains namely Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Universiti Malavsia Sabah (UMS). Universiti Malaysia Sarawak (UNIMAS), and University College Sedaya International (UCSI University), empowering them to host physical events. Additionally, the Department of Chemistry Malaysia (KIMIA Malaysia) has undertaken the mantle of GWB organizer for the first time and serves as the primary breakfast host for this year, thereby enriching the diverse representation of Malaysia's demographic and geographical tapestry within this initiative. This concerted effort signifies a significant stride toward inclusivity and diversity, mirroring the multifaceted essence of Malaysia. The



Mary Carroll • 1st 2024 ACS President & Union College Pr...

Attending my first #GWB2024 event (virtually): sponsored by the Malaysian Institute of Chemistry (IKM) & and American Chemical Society (ACS) #Malaysia Chapter. Thanks to the organizers & panelists! #Catalyzing #Diversity in #Science. IUPAC #ACS\_DEIR



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## **Organizer Highlights**

Sharing novel approaches to GWB Event planning.

"Building New Collaborations is Key"







In 2024, the Malaysian Institute of Chemistry (IKM), in collaboration with the American Chemical Society (ACS) International Malaysia Chapter, are set to host a collaborative webinar aligned with the theme of IUPAC GWB2024: Catalyzing Diversity in Science.

The full content can be viewed through <u>https://mailchi.mp/</u> iupac.org/three-months-to-go-until-gwb2024-13584075? <u>e=6ce168d286</u>











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innovative approach to GWB event planning has garnered recognition from the IUPAC GWB committee, as evidenced in their recent newsletter (Figure 1).

The physical program on 27 Feb 2024 has garnered participation from a total of 240 attendees representing various academic and professional spheres across the eight respective GWB2024@Malaysia organizers (Figure 2). All organizers were convened through a webinar collaboratively organized by IKM and the American Chemical Society (ACS) International Malaysia Chapter co-chaired by Associate Professor ChM Dr Fatimah Salim (IKM/ UiTM) and Associate Professor ChM Dr Hooi Ling Lee (ACS/ USM). In line with this year's emphasis on diversity and inclusivity, the webinar, which centered on leadership, featured distinguished speakers:

- Assoc. Prof. ChM. Dr. Mohd Sukor Su'ait, Chair of ACS Malaysia Chapter
- Prof. Dr. Chai Lay Ching, Pro Vice-Chancellor (Education), Sunway University
- Prof. Emeritus Dr. Normah Omar, Universiti Teknologi MARA (UiTM)

This webinar was integrated into the programs of the eight organizations, held from 10:30 am to 12:00 pm via Zoom meeting, as participants enjoyed their breakfast (Figure 3). The webinar which moderated by Dr. Sheela Chandren. Secretary of ACS Malaysia Chapter attended by at least 130 participants, while the Facebook live stream attracted 1.2k viewers from various organizations. Many shared their attendance and excitement at the GWB2024@Malaysia webinar through their social media accounts including the 2024 ACS President-Elect, Professor Mary K. Carroll (Figure 4). This year's IUPAC GWB2024 has not only celebrated the remarkable contributions of women in science but has also exemplified the power of collaboration, diversity, and inclusivity in driving meaningful future initiatives aimed at advancing gender equity and inclusion in STEM fields. Through engaging discussions, networking opportunities, and inspiring leadership insights, this event has ignited a collective passion to foster a more inclusive and equitable scientific landscape for generations to come. As we reflect on the successes of GWB2024, let us remain committed to championing diversity, empowering women in science, and creating a world where all scientists can thrive and contribute their unique perspectives and talents. We thanked IKM, all







GWB2024@Malaysia organizers, speakers, and webinar organizing committees for making this event successful. The next event will be held on 11 February 2025.





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## SPORO-(POLLEN)-IN BIOSORBENTS MORE THAN WHAT MEETS YOUR NOSTRILS

Ts. ChM Dr. Kumuthini Chandrasekaram Research Officer, Universiti Malaya

Pollens have long since been synonymous with two important circumstances, one for species survival and the other for allergic rhinitis with exhaustive bouts of runny noses, watery eyes, and breathing difficulties. But do you know, there is another side to these pollens? They have been for centuries used in cosmetic and medicinal applications. Does it pique your interest? Let me give a brief introduction to pollens, sporopollenin, biosorbents and

Pollens are natural microcapsules designed to protect the genetic material of plants from external damage. Morphologically, pollens are made up of two layers, the inner layer (intine) consists largely of cellulose, while the outer laver (exine) is mainly composed of sporopollenin [1]. One of the earliest researchers, Brooks et al., defined sporopollenin as the most resistant organic material of direct and biological origin found in nature and in geological samples [2]. **Sporopollenin** in essence, is a highly cross-linked complex biopolymer composed of carbon, hydrogen, and oxygen [1, 3]. The building blocks appear to be varied and complex, comprising straight- and branched-aliphatic chains, some of which are saturated, unsaturated and polyhydroxylated as well as important building blocks involve oxygenated aromatic rings and phenylpropanoid moieties [1, 4]. These unique microcapsules are also reported to provide resilience to alkalis and acids and withstand high temperatures. Sporopollenin derived from the species Lycopodium *clavatum* is reportedly the most widely studied exine with a long-spread historical use as a natural powder lubricant, base for cosmetics, and in both homoeopathic and allopathic medicinal treatments [5].

**Sporopollenin exines** houses a wide variety of functional groups on its surface, including phenolic, alkane, alkene, ketone, lactone, and carboxylic acid groups [1, 6]. This allows the exines to function as microcapsules where surface modifications or functionalized derivatives enable solid-supported applications [6]. Hence the uniform and resilient sporopollenin biopolymer equipped with multifunctional and highly decorated surface with an accessible chamber can be filled with a variety of polar and non-polar actives over a wide range of molecular masses [4]. The biopolymer

microcapsules with suitable modification can also provide targeted selectivity for various applications. **Biosorbents** are the categorically derived definition for the biological materials used in the biosorption process for the removal of pollutants from aqueous mediums. Biosorbents have been receiving a fair amount of attention because of their sustainable properties, such as renewable natural resources, economic viability, and biodegradability which eliminates secondary contaminants generation [7]. Many naturally occurring materials have shown promising potential as biosorbents however the major challenge in the selection of biosorbents lies not only in their sorptive capabilities but also in their recyclability and economic viability. Biosorption defines the removal or recovery of organic and inorganic substances from a solution using biologically and naturally sourced materials such as seaweeds, plant materials, agricultural wastes, industrial wastes, and natural residues. Biosorption is essentially a physicochemical mass transfer process that moves substances from the aqueous phase to the solid phase via mechanisms such as ion exchange, precipitation, absorption, adsorption and surface complexation. During biosorption, the adsorbate in the aqueous phase meets the biosorbent solid phase, prompting mass transfer interaction under the influence of intermolecular interactions and pH conditions [8]. The potential of sporopollenin as an effective biosorbent has been reported for various types of analytes, including drugs, metals, dyes, and pesticides. The sustainable properties of sporopollenin hence propound a good future in the development of environmentally friendly alternatives, especially in the field of biosorbents. The lesson from this small interlude, there is always more than meets the eye or in this case the nose. One man's allergy might be a source of sustainable solutions to another.

Chemistry

*in* Malaysia

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snowing a Reconstructed slice through colithic lim (voxel size: 3.4 µm).



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TrueContrast<sup>100</sup> provides differentiation between phases that traditional micro-CT (top left) cannot differentiate. Full spectral analysis enables multienergy CT - in a single scan, identifying the five different chemical compositions in this sample.



Absolute identification of Ta and W in an ore mineral sample using K-edge localization. Even edges close together can be separated.

June 2024

MALAYSIAN YOUNG CHEMISTS NETWORK

# THE ROLE OF CHEMISTS IN MALAYSIA'S PHARMACEUTICAL INDUSTRY

ChM Afiq Azil, MRSC

Issue No. 155

Lecturer at School of Pharmacy, KPJ Healthcare University

The pharmaceutical industry has bolstered Malaysia's gross domestic product (GDP) by more than USD 1.5 billion. The projected contribution is expected to increase to USD 1.7 billion this year[1]. Given the enormous size of the industry, where exactly does a chemist fit in?

## Pharmaceutical Industry in Malaysia

According to the current membership of the Pharmaceutical Association of Malaysia (PhAMA), there are 41 international pharmaceutical corporations that contribute to this growth. They bring the need for professionals in the fields of regulatory, research and development (R&D), medical expertise, finance, information technology, human resources, legal and compliance, as well as logistics and ethical marketing[2].

In Malaysia, the pharmaceutical sector predominantly emphasizes generic pharmaceutical products as the innovation of new and novel drug formulations is extremely costly and time-consuming. There are currently 51 major pharmaceutical manufacturing companies in Malaysia that are part of the Malaysian Organisation of Pharmaceutical Industries (MOPI)[3]. Thus, there are tremendous opportunities for a chemist to be involved in this big industry.

Chemistry

*in* Malaysia

## What are the Roles of Chemists?

A standard pharmaceutical manufacturing company that produces generic medication typically initiates its operations with research and development (R&D). During this phase, the products outlined in the company's pipeline by its management are formulated and subjected to testing. When a new generic drug formulation is developed, it undergoes extensive analysis, a task that requires the expertise of a qualified professional, a chemist.

The test method is usually obtained from a pharmacopoeial monograph[4]. Some of the most common tests done on drug formulation include physical tests, dissolution tests, assays, and related substances (impurities). All these tests utilise the application of various chemical and analytical instruments. The personnel analysing the drug formulation must possess the necessary knowledge and skills, for example, to conduct an assay test for a drug tablet, the skills required include the preparation of the sample and standard solution including using specifically calibrated glassware, operating high performance liquid chromatography (HPLC),



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and analysing as well as interpreting the chromatogram.

Another important involvement of a chemist is in the Quality Control (QC) aspect of drug manufacturing. All raw materials and drugs manufactured must undergo quality control tests that include physical and chemical analysis to ensure the finished products reaching the consumers are of the highest quality. The output must be compiled in a scheduled report known as a Certificate of Analysis (CoA)[5]. The guideline stated by the National Pharmaceutical Regulatory Agency (NPRA) requires the CoA to be signed by a QC manager or equivalent following the Chemists Act 1975 in the federal constitution which states that only a chemist or a registered pharmacist can certify any report or CoA intended for the public[6].

Another crucial responsibility of chemists is to ensure occupational safety guidelines are adhered to according to the standard set by the Department of Occupational Safety and Health (DOSH) on chemicals and lab safety. This includes the storage and handling of chemicals, chemical waste management and the development and implementation of lab safety protocol.

All these further empower the chemists' profession and prove their presence is essential in the pharmaceutical industry. However, this doesn't imply that chemists are restricted to roles solely within R&D and QC only.

In conclusion, chemists play a multifaceted and vital role within the pharmaceutical industry. From spearheading research and development to meticulous quality control measures, they are pivotal in every stage of drug discovery, formulation, and manufacturing. Moreover, their proficiency extends to maintaining occupational safety standards, ensuring the integrity of pharmaceutical products, and contributing significantly to advancements in healthcare. As the cornerstone of innovation and safety in pharmaceuticals, chemists continue to drive advancement and uphold the

highest standards of quality in the industry.

Ref	erer	ices:
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\* The 1st image source is from Canva Pro (I'm a subscriber) while the second image is from reference no.5

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Heavy Metal Contamination			
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# Congratulations to Datin ChM Dr Zuriati Zakaria for being elected as the President of CASE, 2024-2026

# from IKM President & Council Members



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# **CHEMISTS RULES 2024**

## Message from the President

I am pleased to announce that, finally, we have got the **CHEMISTS RULES 2024** in place. After 6 long years of formulations and deliberations between IKM and the MOSTI Pegawai Undang-Undang (PUU) and Attorney General's Chamber (AGC), the **CHEMISTS RULES 2024** is finally signed by the Honourable Minister of the Ministry of Science, Technology and Innovation (MOSTI), Yang Berhormat Chang Lih Kang, and published in the government gazette on the 5th day of June 2024. This means that these new Rules will be put into practice immediately.

This is the first time that we amended the Chemists (General) Rules 1977. The main purpose is to revise and update the current practice and development in the chemistry profession at present time. The 2024 Rules are published in our website and these are some of the major highlights:

Under Rule 6. Title of a member of the Institute – The member may use the abbreviated title "**ChM**" before his name.

Under Subrule 16(b) Qualification to sit for the final examinations – The following persons are qualified to sit for the final examinations – (b) graduates with a degree in science and technology other than degree in chemistry.

The above Rules are new and there are other changes to the 1977 rules as well. Please refer to the **CHEMISTS RULES 2024** in full.

One of these changes is Subrule 5(2) Retention of membership – If the application of the retention of membership is made after 31 January of the said year, an additional processing fee of fifty ringgit shall be imposed.

We are delighted that the final **CHEMISTS RULES 2024** are now in place and being enforced. This will go a long way to further enhance and develop the chemistry profession in Malaysia.

Datuk ChM Dr Soon Ting Kueh President, Institut Kimia Malaysia 6th June 2024

Chemists Rules 2024 is available at this ink https://ikm.org.my/wp-content/uploads/2024/06/Chemists-Rules-2024-PUA149\_2024.pdf



5 Jun 2024 5 June 2024 P.U. (A) 149	WARTA KERAJAAN PERSEKUTUAN FEDERAL GOVERNMENT GAZETTE
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## International Congress on Pure & Applied Chemistry (ICPAC) Mongolia 2024 Trip to Ulaanbaatar: 22 – 26th April 2024

My flights to Ulaanbaatar, Mongolia started on the early morning of Monday, 22nd April from KLIA to Ulaanbaatar (UB) via Beijing by Air China. We landed at UB airport at 11.00 am but it took us more than 2 hours to reach Holiday Inn. There were chronic traffic jams in the city.

After brunch and a short break, we met up with Mdm Odontungalag M, the Sales & Marketing Manager of Holiday Inn to discuss our proposal to organise ICPAC Mongolia 2024 in her hotel. After the discussion, she took us to view the conference hall and the 5 meeting rooms, 2 at Level 1 and 3 at Level 19.

After that we took a short break before an early dinner. Foods at Holiday Inn are good.

Prof Tamotsu Takahashi arrived from Tokyo at about 8.30 pm.

Subsequent days, we met up with staff of 5 other hotels as follows:

- 23rd April Blue Sky Hotel & Premier Best Western Hotel in the morning Corporate Hotel & Convention Centre in the afternoon
- 24th April Kempinski Hotel in the morning Chinggis Khan Hotel in the afternoon

On 25th April, we took a 1 &  $\frac{1}{2}$  hours trip to Chingisiin Khuree to view the place as a possible tour destination for our delegates.

The **Summary** of our findings are as follows:

Holiday Inn is most suited as a venue for ICPAC Mongolia 2024. ICPAC Mongolia 2024 will be held over 4 days from 28 – 29th August & 31st – 1st September.

On 30th August, the delegates will join a tour to Chingisiin Khuree.

The Congress Gala Dinner will be held on 31st August at the Chinggis Khan Hotel.

Decisions taken:

1. We have booked Holiday Inn as the venue for ICPAC Mongolia 2024 with a deposit of USD10,000 or 34,000,000MNT. This includes the use of the conference hall and 5 meeting rooms and a Welcome Reception on 28th August. The conference package is 155,000 per pax per day over 4 days. The total cost for 120 pax is expected to be less than USD40,000.

2. In addition, we require to hire 6 laptops, 6 cameras & 6 technicians to manage the hybrid mode of the Congress.

3. The tour to Chingisiin Khuree will be on 30th August and it is expected to cost USD100 per pax inclusive of one lunch of Mongolian foods.

4. The Congress Gala Dinner will on 31th August at the Chinggis Khan Hotel. The cost is estimated at USD100 per pax including transfer from and to Holiday Inn.

Items 3 & 4 are yet to be confirmed.

Further information available as at now: Prof Takahashi had sent us a list of 136 Japanese & Chinese



#### June 2024

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## Chemistry *in* Malaysia



participants including 5 students.

Including 8 Malaysian Organising Committee members & 10 complimentary registrations for the Mongolian Chemical Society, we have a total of 154 delegates so far.

We hope to get another 50 participants from Malaysia, China, Korea & Europe.

I must record our sincere appreciation to our Mongolian colleagues, Dr Avid, Nina and Kem, who provide us with all the local transport and helping us to make arrangements with hotels, etc.

That is all for the time being.

Report by: Datuk ChM Dr Soon Ting Kueh Date: 29th April 2024





# **INSTITUT KIMIA MALAYSIA**

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President: Datuk ChM Dr. Soon Ting Kueh

## MALAM KIMIA 2024 Friday, 6 December 2024

Malam Kimia 2024 will be held on Friday, 6 December 2024 at the Citrine & Ruby Ballroom (Level G), One World Hotel, Bandar Utama, 47800 Petaling Jaya, Selangor. Presentation of the IKM Annual Chemistry Awards such as the IKM Gold Medal, Graduate Chemistry Medals, Merit Awards and Laboratory Excellence Awards will be made during the function. The charges for dinner are RM250.00 per person for IKM members and their spouses only and RM300.00 per person for non-members. Companies are welcomed to book a table for RM3000.00.

The closing date for purchase of dinner tickets is 10 November 2024.

REPL	Y SLIP
Executive Director Institut Kimia Malaysia 127B, Jalan Aminuddin Baki Taman Tun Dr. Ismail 60000 Kuala Lumpur	
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1. I wish to purchase the following dinner tickets (Fill in	the number of tickets in box):
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2. I attach payment proof of RM for the	e dinner ticket(s).
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President: Datuk ChM Dr. Soon Ting Kueh

## To: All Senior IKM Members,

Dear Senior IKM Members,

# Senior IKM Members Get-together & Malam Kimia 2024 on Friday, 6 December 2024, Citrine & Ruby Ballroom (Level G), One World Hotel, Bandar Utama, 47800 Petaling Jaya, Selangor

IKM Council has decided to invite all Senior IKM Members (age 60 years and above with at least 10 years of membership) to attend the Malam Kimia 2024 to be held on Friday, 6 December 2024 at the Citrine & Ruby Ballroom (Level G), One World Hotel, Bandar Utama, 47800 Petaling Jaya, Selangor. We are very pleased to extend a complimentary invitation personally to you and hope that you will be able to attend. If you would like to bring your spouse or family members, additional dinner tickets can be purchased from IKM Secretariat. We look forward to your attendance at this function.

ChM Dr Aqeel Saravanan Executive Director

REPLY SLIP

Executive Director Institut Kimia Malaysia 127B Jalan Aminuddin Baki Taman Tun Dr Ismail, 60000 Kuala Lumpur	Date:
MALAM KIMIA 2024	
1. I will attend Malam Kimia 2024.	
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Guest at RM300. (non-member)	00 each
3. I attach payment proof of RM	for the dinner ticket(s).
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Name:	IKM Membership Number:
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Mode of Payment (direct online transfer / wa Name of Account: INSTITUT KIMIA MALAY Account Number: 3127 731017	alk-in / cheque / ATM transfer) SIA Name of Bank: PUBLIC BANK BERHAD Cheque should be made payable to "INSTITUT KIMIA MALAYSIA"

R.S.V.P. by fax or email before 10 November 2024

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# Kuiz Kimia Kebangsaan Malaysia (K<sub>3</sub>M) 2024

Tarikh:3 Oktober 2024Hari:KhamisMasa:10.00 PagiTempat:Sekolah yang<br/>mengambil<br/>bahagian

Institut Kimia Malaysia 127B Jalan Aminuddin Baki Taman Tun Dr Ismail 60000 Kuala Lumpur

# Kuiz Kimia Kebangsaan Malaysia (K<sub>3</sub>M) 2024



Kuiz Kimia Kebangsaan Malaysia (K<sub>3</sub>M) dianjurkan sebagai satu ujian bertulis untuk menguji kefahaman dalam ilmu kimia di kalangan pelajar sekolah menengah di Malaysia. Kuiz ini merupakan kuiz Kimia tahunan yang dianjurkan oleh Institut Kimia Malaysia (IKM) dengan kerjasama sekolahsekolah yang mengambil bahagian.

Kuiz ini terbuka kepada semua pelajar sekolah menengah atas dan Pra Universiti di Malaysia. Kebiasaannya kuiz ini akan diadakan pada jam 10.00 pagi, hari Khamis yang

ketiga bulan Julai setiap tahun di sekolah yang mengambil bahagian. Berikutan perubahan takwim persekolahan oleh KPM, kuiz ini akan dijalankan pada jam **10.00 pagi**, hari **Khamis 3 Oktober 2024**.



## **OBJEKTIF KUIZ**

Adalah seperti berikut:

- Menguji tahap kefahaman dalam ilmu Kimia di kalangan pelajar sekolah menengah
- Menimbulkan minat pelajar peringkat sekolah menengah atas dan Pra Universiti terhadap Kimia
- Memajukan pendidikan Kimia di sekolah
- Memilih pelajar Kimia yang terbaik untuk mengambil bahagian dalam International Chemistry Olympiad (IChO)



## PENYERTAAN KUIZ

IKM akan mengedarkan surat jemputan kepada semua sekolah menengah dan institusi pendidikan yang menawarkan khusus peringkat menengah atas dan Pra Universiti di Malaysia untuk menyertai kuiz ini. Sekolah dan institusi yang berminat untuk menyertai kuiz ini dikehendaki mengisi BORANG PENYERTAAN dan kembalikan bersama dengan SLIP BAYARAN kos pentadbiran yang ditetapkan kepada IKM sebelum tarikh tutup. Sila rujuk CARA BAYARAN di muka surat seterusnya.



## KUIZ KIMIA KEBANGSAAN MALAYSIA (K<sub>3</sub>M) 2024

- Semua peserta K<sub>3</sub>M akan diberikan sijil penyertaan K<sub>3</sub>M.
- Bagi pelajar yang mendapat markah tertinggi akan diberikan sijil tambahan mengikut gred iaitu Merit, Kepujian atau Cemerlang.
- Pelajar yang mendapat markah tertinggi dari setiap aras akan dijemput menghadiri Malam Kimia 2024 untuk menerima sijil Top Scorer Award dan hadiah wang tunai berjumlah RM300 setiap seorang.
- Pelajar yang memperolehi markah tertinggi akan dipilih untuk menyertai program latihan untuk mengambil bahagian dalam International Chemistry Olympiad (IChO) 2025 di United Arab Emirates.



## FORMAT KUIZ

Kuiz ini dibahagikan kepada dua aras:

- Aras Asas untuk pelajar Tingkatan 4, 5 dan 'O Level'
- Aras Lanjutan untuk pelajar Tingkatan 6 dan Pra Universiti

Sila ambil perhatian bahawa soalan kuiz tidak merangkumi hanya sukatan pelajaran SPM untuk aras Asas atau sukatan pelajaran STPM untuk aras Lanjutan.

Kuiz ini mengandungi 40 soalan objektif; soalan adalah dalam Bahasa Melayu dan Bahasa Inggeris bagi aras Asas dan Bahasa Inggeris sahaja bagi aras Lanjutan. Pelajar dikehendaki menjawab kesemua soalan ini dalam masa satu jam dan dua puluh minit menggunakan borang jawapan (OMR) yang dibekalkan.



## SIJIL PENYERTAAN DAN **KOS PENTADBIRAN**

Setiap pelajar yang meyertai kuiz ini dikehendaki membayar kos pentadbiran sebanyak RM10.00.

Bayaran ini membolehkan pelajar:

- Menyertai Kuiz pada masa, tarikh dan tempat yang ditetapkan
- Skrip jawapan mereka diperiksa
- Menerima sijil penyertaan



# **CARA BAYARAN**

Bayaran hendaklah dibuat melalui PINDAHAN ANTARA BANK (TUNAI SAHAJA). Samaada diatas talian ataupun melalui mesin ATM.

Maklumat akaun bank seperti dibawah: Bank: PUBLIC BANK BERHAD Nama Akaun: INSTITUT KIMIA MALAYSIA No. Akaun: 3127 7310 17

Selepas bayaran dibuat, mohon emelkan SLIP **BAYARAN & BORANG PENYERTAAN ke alamat** emel k3m@ikm.org.my. Mohon hubungi IKM dengan kadar segera sekiranya emel Tuan/ Puan tidak dibalas dalam tempoh masa 5 hari bekerja. Tidak perlu hantar melalui pos.

Kegagalan berbuat demikian akan menyebabkan penyertaan sekolah Tuan/Puan tidak diproses.



# HAK HAKIM DAN IKM

Keputusan hakim adalah muktamad dan semua rayuan tidak akan dilayan. IKM berhak mengubahsuai peraturan kuiz tanpa memaklumkan kepada peseta.

# PEMERIKSAAN DAN PENGREDAN

Guru tidak dibenarkan memberi pelajar sebarang bantuan semasa Kuiz dijalankan. Semua borang jawapan (OMR) akan diperiksa oleh mesin pengimbas yang telah diprogramkan.

Pelajar akan dimaklumkan skor mereka melalui sekolah.

Untuk pelajar yang menunjukkan pencapaian yang baik dalam Kuiz ini, salah satu sijil berikut akan diberikan berdasarkan skor mereka:

- Sijil Merit
- Sijil Kepujian
- Sijil Cemerlang



Semua borang jawapan (OMR) akan diperiksa oleh mesin pengimbas yang telah diprogramkan. Setiap pelajar hendaklah menghitamkan borang OMR dengan betul supaya tidak terdapat kesalahan ejaan didalam sijil dan keputusan yang akan dikeluarkan.

\*Kami tidak akan melayani sebarang permintaan sijil yang baru





Emel: k3m@ikm.org.my



Laman Web: https://ikm.org.my



# **KUIZ KIMIA KEBANGSAAN MALAYSIA** K<sub>3</sub>M 2024

## Borang Penyertaan K<sub>3</sub>M 2024

Kami ingin mengambil bahagian dalam Kuiz Kimia Kebangsaan Malaysia (K<sub>3</sub>M) 2024

Kod Sekolah :			
Nama Sekolah :	 		 
Alamat :	 		 
Poskod :			
Daerah :	 		 
Negeri :	 		 
No. Tel :	 N	o. Fax: –	 
Guru Penyelaras :	 		 
No. Tel. Bimbit :	 		 
Email Guru :	 		 

Aras	Tingkatan	Bil. Penyertaan	Bayaran (RM10 x bil. Pelajar)
	4		
Asas	5		
	6 Rendah		
Lanjutan	6 Atas		
422.03	Matrikulasi		
Jumlah			

\*Kos pentadbiran adalah RM10.00 bagi setiap seorang pelajar. Sila nyatakan bilangan penyertaan pelajar di dalam ruangan yang disediakan diatas.

Tandatangan Pengetua/Pen. Kanan :	
Nama Pengetua :	
Tarikh :	
Jumlah bayaran :	
Tarikh bayaran dibuat:	
Cop Sekolah	

Tarikh : 3 Oktober 2024

- Hari : Khamis
- : 10.00 Pagi Masa
  - ☑ Tidak lewat sebelum atau pada 31 Julai 2024
  - Penyertaan lewat tidak akan dilayan
  - ☑ Borang penyertaan salinan fotostat adalah diterima

Bayaran hendaklah dibuat melalui PINDAHAN ANTARA **BANK ataupun DEPOSIT** TUNAI sahaja. Sama ada diatas talian ataupun melalui mesin ATM. Maklumat akaun bank seperti dibawah: Bank: PUBLIC BANK BERHAD

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Selepas bayaran dibuat, mohon emelkan **SLIP BAYARAN &** BORANG PENYERTAAN ke alamat emel ini k3m@ikm.org.my

MOHON HUBUNGI IKM DENGAN KADAR SEGERA SEKIRANYA EMEL **TUAN/PUAN TIDAK DIBALAS DALAM TEMPOH MASA 5** HARI BEKERJA.

## TIDAK PERLU HANTAR **MELALUI POS.**

Kegagalan berbuat demikian akan menyebabkan penyertaan sekolah Tuan/Puan tidak diproses.

Untuk kegunaan pejab	at
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Bayaran d	it	e	r	i	n	1	a		F	2	N	٨	:						•	•	•	•••	
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- · Evaporate up to 48 samples with independent control of flow in each row.
- · Adjustable nozzles for optimum evaporation speed and recovery.
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- Flexible Rack System to accommodate different size of the tubes



# **HOW IT WORKS?**

- The set nitrogen flow (mL/min) exits the angled needle and flows down and around the inside of the evaporation tube in a helical motion.
- Once the nitrogen reaches the solvent extract, the extract begins to cyclone. This function protects your extracts, especially the lighter end compounds.
- The vortex is important because it is constantly mixing your extracts ensuring homogenization throughout the entire concentration process.

\*\* A lot more different configuration also available upon request











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# **Applications:**

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**Drug Discovery** 

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- Purify several cannabinoids in one step from crude oil
- Purify [6]-Gingerol from Ginger by CPC for flavouring

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# 34th Chinese Chemical Society (CCS) Congress 2024 & 84th FACS EXCO Meeting 2024

On the invitation from Prof Lijun Wan, President of the Chinese Chemical Society (CCS), I attended the 34th Chinese Chemical Society (CCS) Congress in Guangzhou, China. The 34th CCS Congress was held in the Guangzhou Baiyun International Convention Center from 15 – 18th June 2024. This is a huge scientific conference with an attendance of close to 17,000 participants.

## **Opening Ceremony**

The Congress Opening Ceremony was held from 2.00 pm on 15th June 2024. Prof Lijun Wan, President of the Chinese Chemical Society (CCS) gave the Welcome Address. The Ceremony was followed by the following three Plenary Lectures:

Pushing Boundaries: Innovations in Organometallic Complexes and Catalysts for Advanced Chemical Transformations

Prof Zhaomin Hou, RIKEN Center for Sustainable Resource Science, Japan

Protein Corona and Nanomedicine Regulation Strategies Prof. Chunying Chen, National Center for Nanoscience and Technology, China

Coordination Chemistry at Metal-Surface Interfaces *Prof. Nanfeng Zheng, Xiamen University* 

This was followed by the VIP Banquet at the Convention Center Banquet Hall at 6.30 pm for the VIPs.

## **Chemistry Leadership Forum**

On the morning of 16th June 2024, there was a session on "Chemistry Leadership Forum" where Prof Lijun Wan, President of CCS, gave the Welcome Address. I made a presentation on "IKM as a leading chemistry organization" at this Forum. This was generally well received by audiences. The speakers at Forum are as follows: Prof Ehud Keinan, President of IUPAC Prof Onder Metin, Secretary General of FACS Prof Gillian Reid, President of Royal Society of Chemistry (RSC) Dr James Milne President of ACS Publications Prof Loh Xian Jun, President of Singapore National Institute of Chemistry (SNIC)

Datuk Dr Soon Ting Kueh, President of Institut Kimia Malaysia (IKM)

Prof Supa Hannongbua, President of Chemical Society of Thailand (CST)

Prof Raymond Wong Wai-Yeung, President of Chemical Society of Hong Kong (HKCS)

Dr Maurizio Quinto, Representative of Italian Chemical Society (SCI)

Prof Shin Seokmin, Past President of Korean Chemical Society (KCS)

Prof Zhigang Shuai, Vice President of Chinese Chemical Society (CCS)

At the closing of the Forum, I presented an IKM tie as a souvenir to Prof Lijun Wan. We were then invited to a VIP Banquet at the Baiyun International Conference Center for a sumptuous lunch.

#### FACS EXCO Meeting

The 84th Meeting of the Federation of Asian Chemical Societies (FACS) Executive Committee (EXCO) was held on the 16th June 2024 at 2.00 pm. I attend the EXCO Meeting as an observer. Prof Supa Hannongbua, President of the Chemical Society of Thailand made a presentation on the 20th Asian Chemical Congress (20ACC) to be held in Bangkok, Thailand from 23 – 27th June 2025. The next 85th FACS EXCO Meeting will be held Daegu, South Korea on 18th October 2025 to be hosted by Korean Chemical Society.



# Chemistry <sup> //</sup> Malaysia



June 2024

Issue No. 155

**BERITA IKM** 

**Congress Opening Ceremony** 





Elerre P.













# You're Invited: Introducing the Game-Changing Future of Mass Spectrometry

On 3 June 2024, Thermo Fisher Scientific unveiled how it will revolutionize science with the next era in mass spectrometry. We invite you to the virtual unveiling to gain first-hand knowledge about this exciting development!



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# Webinar: Pushing the Frontiers of Mass Spectrometry

To answer challenging biological questions, mass spectrometry (MS) must rise to the challenge of achieving unprecedented throughput with comprehensive coverage of complex samples. With analysis time reduced to several minutes by fast liquid separations, confident identification, and quantitation over many orders of dynamic range require a generational leap in MS performance. The Thermo Scientific<sup>™</sup> Astral<sup>™</sup> analyzer is a novel class of high-resolution accurate-mass analyzer that complements the Thermo Scientific<sup>™</sup> Orbitrap<sup>™</sup> analyzer to provide high speed and sensitivity measurements.

Join our star scientists, Dr Alexander Makarov and Dr Hamish Stewart as they delve into the advanced technology behind the Thermo Scientific<sup>™</sup> Orbitrap<sup>™</sup> Astral<sup>™</sup> mass spectrometer and its transformative impact on scientific exploration. This free webinar will explore the underlying technology of the Thermo Scientific<sup>™</sup> Orbitrap<sup>™</sup> Astral<sup>™</sup> mass spectrometer and its application to life science research. Rethink what is possible with a mass spectrometer that can:

- analyze 300 proteomics samples per day
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- collect fragmentation data on over 90% of compounds in metabolomics experiments

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# BACK TO BASICS HPLC

# Back to basics: Revealing the Strength of HPLC-CAD Methods

In recent years, the use of quantitative liquid chromatography (LC) coupled with charged aerosol detection (CAD) for poor UV absorbing analytes in multicomponent mixtures has grown exponentially across industrial sectors.

In this webinar, experts from Thermo Fisher Scientific will highlight some distinctions between CAD and other UVabsorbance detection methods, such as non-linearity in response to analyte concentration, and sensitivity to mobile phase impurities. Despite so, through careful optimization of CAD parameters, successful development, and transfer of analytical methods, nearly on par with that of conventional UV absorbance detectors, can be achieved. By meticulously tuning CAD parameters, we have developed quantitative LC-CAD assays which are sensitive, precise, accurate and robust across early and late-stage pharmaceutical development. Examples of LC-CAD methods employed at various stages of drug development, spanning from discovery to commercialization, will be shared during the presentation. Hear from Thermo Fisher Scientific's invited speakers about the benefits of CAD, optimization for method development, and its applications in pharmaceutical development. Among the key learning points are:

- Optimization: Optimizing non-linear detection response
- Troubleshooting: Tips and tricks to maintain a CAD detector
- Transfer: Examples of HPLC-CAD successfully developed and transferred (nearly on par with conventional HPLC-UV)
- Implementation of HPLC-MS-CAD for post µg-purification analysis

#### **Register here:**





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## Do You Know

What lurks in your favorite fish curry masala? Recently, spice mixtures containing traces of harmful ethylene oxide have come under the spotlight. According to the US Environmental Protection Agency (EPA) in 2018, exposure to ethylene oxide increases the risk of certain types of cancers.

In this section, we examine Food Safety, particularly the analysis of ethylene oxide and 2-chloroethanol residues in food using triple quadrupole mass spectrometry technologies.

# Application Note: Analysis of Ethylene Oxide and 2-Chloroethanol Residues in Food using GC-MS/MS

In recent times, major media around the world have reported growing concerns about the safety of spices due to suspected elevated levels of ethylene oxide, a cancer-causing pesticide. Regulators in various countries are conducting their own investigations. For instance, the US Food and Drug Administration (FDA) is investigating products that may potentially contain the pesticide while the European Union (EU) has discovered the same cancer-causing substance in samples of chilli peppers and peppercorns.

The aim of this application note is to demonstrate the utility of the Thermo Scientific<sup>™</sup> TRACE<sup>™</sup> 1610 GC system and the Thermo Scientific<sup>™</sup> TSQ<sup>™</sup> 9610 triple quadrupole GC-MS/ MS for the analysis of ethylene oxide and 2-chloroethanol residues in food samples.

Ethylene oxide (EO) is a colorless and flammable gas with a broad spectrum of applications, including the preservation of dry food products, such as seeds, milled cereals, spices, herbs, nuts, milk powder, and raisins. However, consumption of EO can negatively impact human health as it is a mutagenic and carcinogenic compound with additional adverse effects on the central nervous system and mucous membranes.<sup>1,2</sup>

Thus, residues of EO and its degradation products therefore need to be monitored closely. The importance of the EO analysis is highlighted by the high number of notifications of EO detection in food published in the Rapid Alert System for Food and Feed (RASFF). From January 1 to April 30 in this year alone, 96 alerts have been registered for the detection of EO in food.<sup>3</sup>

Ethylene oxide poses challenges for analysts as a small and highly volatile molecule with a boiling point of only 10.7 °C. This means that special precautions must be taken during sample preparation to avoid analyte losses through evaporation. In addition, EO is weakly retained on GC columns and elutes just after the void time. EO is a reactive compound and easily forms reaction products (e.g., 2-chloroethanol, 2-bromoethanol and ethylene glycol) within the sample matrix. The residue definition of EO according to Reg. (EU) 2015/868 includes two compounds, ethylene oxide and 2-chloroethanol (2CE), where the sum of EO and 2CE expressed as EO is required to be reported. The maximum residue level (MRL) depends on the commodity and ranges from 0.02 to 0.1 mg/kg.<sup>4,5</sup> High sensitivity is a prerequisite to achieve the required limits of quantification for EO and its degradation products. However, analytical testing laboratories also require a robust and reliable system to test large numbers of samples without the need to perform maintenance on either the GC (i.e. exchange of the liner, trimming of the analytical column) or the mass spectrometer (cleaning and/or re-tuning of the ion source).

This application note demonstrates sensitivity, accuracy, linearity, and selectivity of the ethylene oxide residue analysis. An extended robustness study was also performed to show the stability of the analytical method. To meet regulatory compliance, the methodology follows European Commission quality control guidance document "Analytical quality control and method validation procedures for pesticide residues analysis in food and feed" (Document N° SANTE/11312/2021).<sup>6</sup>

References:  $^{\rm r.6}$  This is a summary only. For full references, please read the actual application proof note.



## Download the application note here:





## Fun Fact

Lithium-ion batteries are used in multiple applications, from smartphones to electric vehicles (EVs). Due to its growing applications, it is imperative to understand how an analytical technique, ion chromatography coupled with high-resolution mass spectrometry (IC-MS/MS), can be used in battery material testing.

By having a greater understanding of degradation mechanisms in lithium-ion batteries, laboratory professionals can ensure product quality during manufacturing using ion chromatography (IC). IC allows laboratory professionals to identify non-volatile electrolyte degradation products and, when coupled with ICP-MS, offers quantification of metal-based degradation species.

# Application Note: Determination of tetrafluoroborate, perchlorate, and hexafluorophosphate in an electrolyte sample for lithium-ion battery production

The goal is to update the application that determined tetrafluoroborate, perchlorate, and hexafluorophosphate in an electrolyte sample that was designed to simulate a lithium-ion battery production sample with new equipment and a current generation electrolytic suppressor.

Rechargeable batteries are an increasing part of our daily life as we use more portable electronic devices, including mobile phones. These batteries are also important for the electric car industry. Lithium-ion batteries are the most commonly used rechargeable batteries because of their high volumetric energy density.<sup>1</sup>

The electrolyte in these batteries are lithium salts in non-aqueous solutions. Commonly used lithium salts are lithium hexafluorophosphate (LiPF<sub>6</sub>), lithium perchlorate (LiClO<sub>4</sub>), lithium tetrafluoroborate (LiBF<sub>4</sub>), lithium hexafluoroarsenate (LiAsF<sub>6</sub>), lithium hexafluorosilicate (LiSiF<sub>6</sub>), and lithium tetraphenylborate (LiB(C<sub>6</sub>H<sub>5</sub>)<sub>4</sub>). Commonly used organic solvents are ethylene carbonate, diethyl carbonate, dimethyl carbonate, ethyl methyl carbonate, propylene carbonate, methyl formate, methyl acrylate, methyl butylate, and ethyl acetate.<sup>1</sup>

The electrolyte in lithium batteries may have a mixture of these lithium salts and organic solvents. The electrolyte's concentration in the solvent ranges from 0.1 to 2 M, with an optimal range of 0.8 to 1.2 M.

The anions of the added lithium salts can be determined by ion chromatography (IC) to ensure that the solutions have been prepared at the proper concentrations. Thermo Scientific<sup>™</sup> Application Note 258 (AN258)<sup>2</sup> demonstrated that the anionic content can be determined accurately using a Thermo Scientific<sup>™</sup> Reagent-Free<sup>™</sup> Ion Chromatography (RFIC<sup>™</sup>) System with 4 mm versions of Thermo Scientific<sup>™</sup> Dionex<sup>™</sup> IonPac<sup>™</sup> AS20 Columns.

In this application note, we demonstrate the same application using updated equipment and suppressor with 2 mm versions of Dionex IonPac AS20 columns and an improved method for the determination of the lithium salt anions in simulated battery electrolyte solutions.

References: 1-2 This is a summary only. For full references, please read the actual application proof note.



#### Download the application note here:





# 21<sup>ST</sup> ASIAN CHEMICAL CONGRESS

18 to 23 July 2027 Kuala Lumpur Convention Centre (KLCC), Kuala Lumpur, Malaysia

23<sup>rd</sup> General Assembly of the Federation of Asian Chemical Societies | 17 July 2027

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M/6648/10651/24	Muhammad Najmi Bin Md Sobri M/6701/10740/24	Sarmila A/P Nagappan <i>M</i> /6671/10700/24						
M/6695/10728/24	Muhammad Nuaim Rifqi Bin Roslaili M/6657/10674/24	Siti Ayu binti Aziz <i>M</i> /6698/10731/24						
Anita Binti Ramii, Dr. <i>M</i> /6692/10725/24	Nelson Chear Jeng Yeou M/6696/10729/24	Siti Fatimah Nur binti Abdul Aziz, Dr.						
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Cheong Han Wei <i>M/6658/10676/24</i>	Noor Fadilah Binti Yusof	Siti Nor Atika Binti Baharin, Dr.						
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Choong Shiau Huai, Dr. M/6642/10639/24	M/6/02/10/41/24 Nor Afieqah Binti Jusoh	M/6652/10668/24 Siti Nur Fatihah Binti Mohd Roslan						
Elvon Bin Binawan	M/6667/10693/24 Norhidavah Binti Rosle	M/6699/10733/24						
M/6707/10748/24 Eswaran A/L Madiahlagan	M/6638/10632/24	Siti Nur Surhayani Binti Jefri M/6689/10722/24						
M/6660/10680/24	M/6688/10721/24	Siti Nurhidayah Binti Sharin M/6656/10672/24						
<i>M/6663/10684/24</i>	Normawati Binti Mohamad Yunus, Dr. M/6704/10745/24	Siti Nurhidayah binti Sharulezam M/6661/10681/24						
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M/6683/10714/24	Nur Arif Bin Mortadza, Dr. <i>M</i> /6646/10647/24	Soo Ying Han						
Izza Hashimah Ishak Binti Abdullah M/6641/10636/24	Nur Farhana Binti Md. Yusoff <i>M</i> /6649/10655/24	Su Lian Zye						
Kalai Magal A/P Manickam M/6674/10703/24	Nur Jahan Binti Ahmad, Dr. M/6681/10712/24	<i>M/6703/10744/24</i> Wan Hafizi Bin Wan Ishak, Dr.						
Khairul Amrullah Bin Sapri M/6662/10682/24	Nur Shazwani Binti Abdul Mubarak	M/6690/10723/24 Yap Keat Leong						
Lau Pei Ying M/6677/10708/24	Nurarifah binti Sharuddin	M/6659/10678/24						
Lau Yin Yee	Nurul Asma binti Samsudin, Dr.	M/6666/10692/24						
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Loh On Kei <i>M/6640/10634/24</i>	Phoebe Sussana Primus M/6691/10724/24	Amir Afdzal Bin Sulaiman L/3615/10662/24						
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Siti Zulyana Binti Azmi L/3605/10641/24

> Tan Jin Yee L/3626/10694/24

Thiban Raj A/L Mathiyalahan L/3632/10732/24

> Venitaa A/P Krishnan L/3602/10583/24

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> Nurul Nadiah Binti Armys M/6708/8574/20/24

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> Rafidah Binti Selaman M/6715/7522/16/24

## Upgrade to Fellow (FMIC)

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Nor Aziyah binti Bakhari, Assoc. Prof. Dr. F/0147/6394/13/24





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