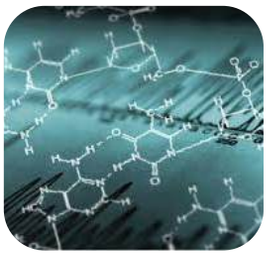

Berita IKM - Chemistry in Malaysia

June 2025

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Kuala Lumpur Convention Centre, Malaysia

Chemistry for Sustainable Future

53rd IUPAC General Assembly (53GA)
12th - 16th July 2025

50th World Chemistry Congress (50WCC)
14th - 19th July 2025

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CONTENTS

MESSAGE FROM THE PRESIDENT

Moving forward - 2025 and beyond

Time flies and we are already in the middle of 2025. One of our major coming events is **IUPAC 2025**, which is just a month away.

IUPAC 2025

We are at our last leg in preparing for **IUPAC 2025** which comprises **53GA** & **50WCC.** With the theme of "***Chemistry for Sustainable Future"***, **IUPAC 2025** will be held in the Kuala Lumpur Convention (KLCC) from 12 – 19th July 2025.

The **53rd IUPAC General Assembly (53GA)** will be held from 12 – 16th July with close to 300 people participating. **53GA** will comprise a number of IUPAC events including Divisions and Committee Meetings, Science Board & Executive Board Meetings, World Chemistry Leadership Meeting (WCLM) and Council Meetings. It will include a Town Hall Meeting, Presidents' Forum and the International Young Chemists Meeting (IYCM).

On the other hand, the **50th World Chemistry Congress (50WCC)** is a major international scientific meeting with close to 2,000 delegates taking part and 1,330 presentations. It will be held from 14 – 19th July with the Opening Ceremony on 14th July. For **50WCC**, we have three Clusters of scientific sessions comprising I) Pure & Applied Chemistry, II) Chemistry & SDGs and III) Thematic Sessions. These Sessions are managed by IUPAC Divisions & Committees, IKM and other Collaborating Organisations. All information on the **53GA & 50WCC** are available on the website, **iupac2025.org**.

Continuous Professional Development programme for Registered Chemists

Another major area of development in 2025 is the Continuous Professional Development (CPD) programme for registered chemists under the Chemists Act 1975. We shall start planning for the CPD programmes in 2025 and by 2026, we shall be ready to put it to a trial run before full implementation in 2027. The following four sub-committees have been established to look into the implementation of CPD programme in 2027:

- **Sub-Committee 1: Legality**
- **Sub-Committee 2: Publicity, Awareness, and Education**
- **Sub-Committee 3: Administration, Finance, and Implementation**
- **Sub-Committee 4: CPD Programme Development**

Accreditation of Chemistry Programmes in Malaysian Universities

Another major area that we had started is the **Accreditation of Chemistry Programmes in Malaysian universities**. After the adoption of IKM's **Chemistry Programme Standard** for Malaysian universities by the Malaysian Qualification Agency (MQA), we are ready for the accreditation of undergraduate chemistry programmes in Malaysia. By mid-2025, MQA will inform the universities to apply for provisional accreditation with MQA with their new chemistry programmes that are in compliance with **IKM Chemistry Programme Standard.** IKM will process and evaluate these applications for provisional accreditation by MQA. After a three years period of provisional accreditation, the universities shall apply for full accreditation by IKM-MQA.

So, we shall have the above three major programmes on for 2025. The success of these major activities is crucial to the further development of IKM. We need members' support for all these to make IKM a truly well-established professional scientific organisation well recognised by all. I look forward to welcoming all of you at **IUPAC 2025**.

Thank you and God blessed.

Datuk ChM Dr Soon Ting Kueh
President, Institut Kimia Malaysia
Date: 1st June 2025

3rd Commonwealth Chemistry Congress & 5th Commonwealth Chemistry General Meeting 2025

In 2018, a group of representatives from 30 chemical societies from Commonwealth nations convened in London to explore the formation of a unified federation. The Federation of Commonwealth Chemical Sciences Societies was formally established in 2020. To be known as Commonwealth Chemistry, her vision is "One Community, one voice, catalysing equality for all" to reflect the diverse backgrounds of nations that makes up the Commonwealth. Her Mission is "To inspire, celebrate and elevate the role and practice of the chemical sciences for the benefit of Commonwealth nations and their people".

The flagship event for Commonwealth Chemistry is the biennial Commonwealth Chemistry Congress (CCC) targeting early career chemists to present their research work in the areas pertaining to the Sustainable Development Goals. Some key facts of the Commonwealth are; it is home to 12% of the world's researchers, it accounts for around 10% of global research and development expenditure and an estimated 60% of its population is under the age of 30. Thus far, the Congress has been held thrice. The 1st was held virtually in 2021, 2nd in 2023 in Trinidad and Tobago and the 3rd in Stellenbosch, South Africa. Commonwealth Chemistry focuses on research in the key areas of: Green and Sustainable Chemistry, Health and Medicine, Agriculture and Food Security, Education and Capacity Building, Climate Change and Environmental Chemistry and finally Equality and Inclusion in Science.

The 3rd Commonwealth Chemistry Congress (3CCC) & 5th Commonwealth Chemistry General Meeting was held in Stellenbosch, South Africa from 12 – 14th May 2025. An IKM delegation comprising Datuk ChM Dr Soon Ting Kueh as a member of the Executive Board, ChM Dr Yang Farina Abdul Aziz representing IKM and three early career chemists from Malaysia attended the functions. During the 5th General Meeting, Datuk Soon formally stood down as an Executive Board Member. Following a process of nomination and voting ChM Dr Yang Farina was duly elected as an Executive Board Member for a 3 years term, from 2025 to 2028. At 3CCC, Dr Yang was invited to be a panellist on the Forum about Gender Equality (SDG5) and Reduced Inequalities (SDG10). When she described that a working mother has to multitasks many different jobs at the same time akin to an octopus, many in the audience wanted to say something. The time for the forum was extended to allow for the voices of the participants to be heard.

We are proud to see the participation of Assoc Prof ChM Dr Lee Hwei Voon from Universiti Malaya as a keynote speaker on the themes of Affordable and Clean Energy (SDG 7) and Responsible Consumption and Production (SDG 12). Her keynote address is titled "Catalytic Innovations for Biomass Conversion: Driving Malaysia's Green Economy," centred on Malaysia's potential as a leading hub for biomass processing in Southeast Asia. This potential is due to the country's significant reserves of affordable and abundant oil palm biomass, making it a major producer and exporter of palm oil products. The Malaysian government has pinpointed the biomass sector as a crucial driver of economic growth. Following a rigorous national nomination process, IKM selected three promising early career chemists to represent Malaysia: Dr. Khairil Anuar bin Jantan from the Faculty of Applied Sciences at UiTM, Dr. Siti Fatimah Nur binti Abdul Aziz from the School of Chemical Sciences at USM, and Dr. Muhammad Ameerullah bin Sahudin from the Department of Chemistry at UM. Dr. Khairil Anuar bin Jantan's selection to represent Malaysia at this prestigious event is a testament to his groundbreaking research. His project, titled "From Waste to Wander: Palladium Recovery Product Catalyze C-H Functionalization and C-N Bond Formation," has garnered significant attention. The project focuses on palladium-catalyzed transformations, which are crucial in industrial activities, particularly in the fields of fine chemicals and pharmaceuticals. By utilizing readily available and inexpensive reagents, Dr. Jantan's research aligns with the United Nations Sustainable Development Goals 7 (Affordable and Clean Energy) and 12 (Responsible Consumption and Production). His work demonstrates a commitment to sustainability and innovation, setting a new standard for green chemistry. Dr Siti Fatimah presented her work on "Water Quality Monitoring: Electrochemical Solutions for a Cleaner Future," which focused on the development of low-cost electrochemical methods for detecting and degrading water pollutants. This research aligns with Sustainable Development Goal 6: Clean Water and Sanitation, and addresses three major






categories of contaminants—heavy metals, phthalates, and microplastics. The first part of the research work involved the use of modified carbon pencil electrodes enhanced with silver nanoparticles and a green solvent ionic liquid. Optimization through statistical analysis namely Central Composite Design and Response Surface Methodology (CCD/RSM) improved the electrode's conductivity and selectivity for detecting Pb(II), Cd(II), and Zn(II) ions. The second component focused on the green synthesis of a bimetallic zeolitic imidazolate framework (M-ZIF-8), which was doped with metal ions and applied to detect phthalate plasticizers such as diethyl phthalate and di-n-butyl phthalate. The final part of the research work examined the use of Ruthenium-doped ZIF-8 on 3D graphite felt electrodes for the electrochemical degradation of polystyrene microplastics. The multifunctional nature of these materials offers an integrated approach for water quality monitoring and remediation. Dr. Ameerullah's expertise lies in inorganic synthesis and the development of sensor technologies. At the congress, he presented his ongoing research focused on innovative sensor technology to address food insecurity, supported by a RM300,000 research grant from Universiti Malaya. This technology directly contributes to the United Nations Sustainable Development Goal 2: Zero Hunger (SDG 2), highlighting chemistry's critical role in achieving global food security.

At the 5th CC General Meeting held on 14th May 2025, the Executive Board announced that the 4th Commonwealth Chemistry Congress (4CCC) will be held in Agra, India in 2027. The Congress was well organised and the Malaysian delegates had a good time mingling and creating new bridges for future collaborations. The gala dinner was held at this beautiful vineyard which looked ethereal as the sun was setting. The Malaysian delegation took time off after the congress to visit Cape Town. Among the places we visited was Table Mountain, Boo-kaap, Cape of Good Hope, Boulders Beach Penguin Colony, Hout Bay, the scenic Chapman's Peak Drive and savoured their very fresh seafood. South Africa is a must visit place that you must include in your bucket list!

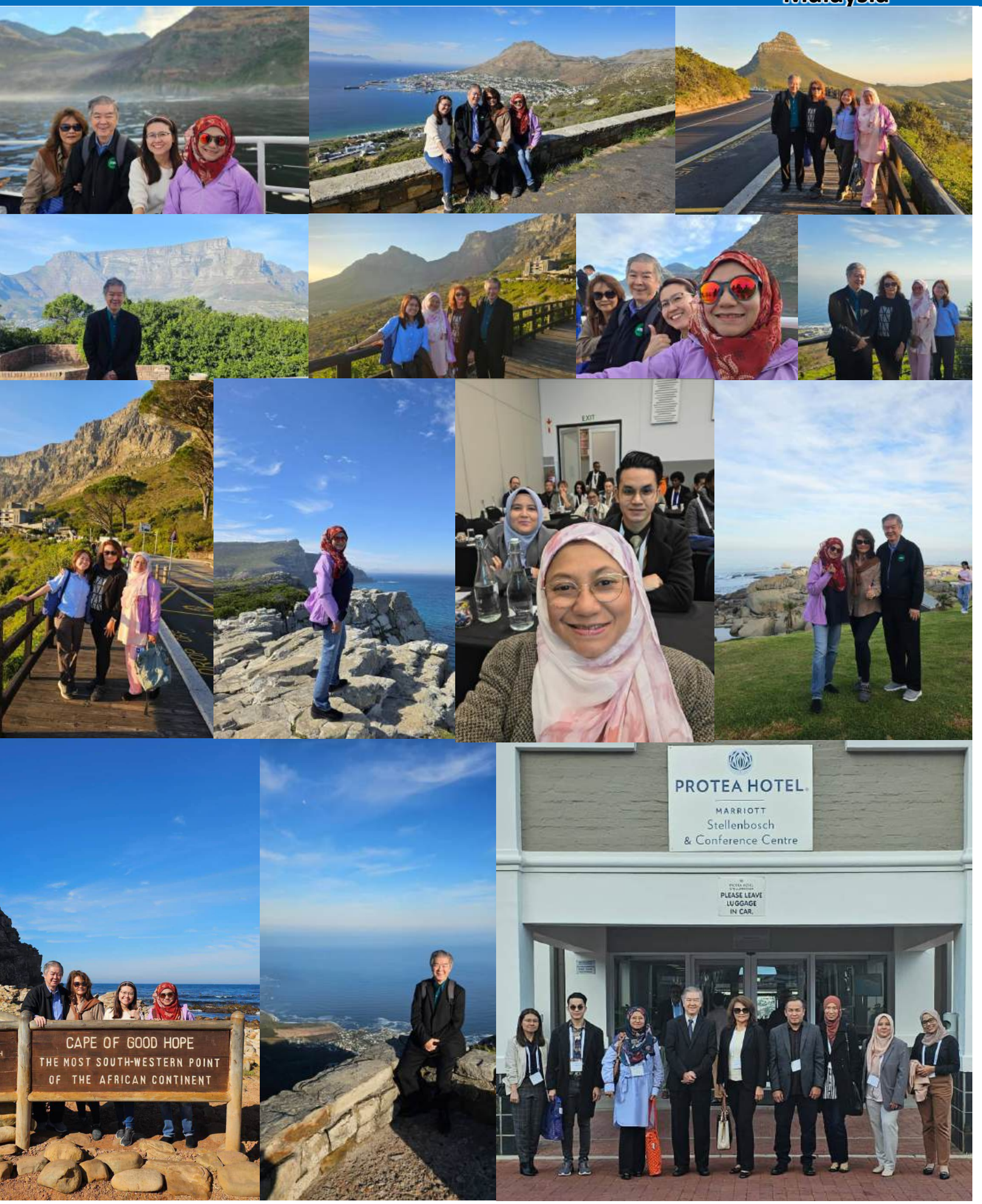
Overall, it was a fruitful, rewarding and enjoyable trip.







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IUPAC GLOBAL WOMEN BREAKFAST 2025: ACCELERATING EQUITY IN SCIENCE

The IUPAC Global Women's Breakfast 2025 (GWB2025) continues its mission to inspire and unite scientists worldwide under the theme "Accelerating Equity in Science." This global initiative encourages participation from a diverse range of scientific organizations, including high schools, universities, companies, and governmental and non-governmental bodies. By fostering cross-sector collaboration, event leaders play a vital role in promoting inclusivity and knowledge-sharing within the scientific community. On 11 February 2025, GWB2025 successfully connected 449 events across 78 countries, reaffirming a global commitment to advancing equity in science.

In Malaysia, the Institut Kimia Malaysia (IKM) once again proudly leads the Malaysian chapter of GWB2025 by consolidating Malaysian organisers through a webinar titled Accelerating Equity in Science, with the American Chemical Society (ACS) International Malaysia Chapter as co-organizer. To support the initiative, IKM awarded ten mini grants to institutions hosting physical breakfast events. The recipients included Universiti Sains Malaysia (USM), Universiti Teknologi MARA (UiTM), Universiti Malaya (UM), Universiti Putra Malaysia (UPM), Universiti Malaysia Sabah (UMS), Universiti Kebangsaan Malaysia (UKM), Universiti Teknologi Malaysia (UTM), UCSI University, Universiti Malaysia Sarawak (UNIMAS), and Jabatan Kimia Malaysia (KIMIA Malaysia).

Since 11 February 2025 is a public holiday in Malaysia, the webinar was held a day earlier, on 10 February 2025. Building on the success of GWB2024, this year's event once again united ten institutions for a one-hour forum webinar hosted by IKM and the ACS International Malaysia Chapter. The organizing team comprised Assoc. Prof. ChM Dr. Fatimah Salim from UiTM and IKM, and Assoc. Prof. ChM Dr. Lee Hooi Ling from USM, under the guidance of IKM Vice President, ChM Dr. Yang Farina Abdul Aziz, alongside members of IKM and the ACS International Malaysia Chapter.

The webinar successfully attracted 150 participants, extending beyond the ten host institutions. The webinar featured three esteemed speakers from academia and industry: Prof. ChM Dr. Yatimah Alias from Universiti Malaysia Pahang, Prof. Ir. Dr. Rosdiadee Nordin from Sunway University, and Dr. Jezamine Lim from Cell Biopeutics Resources Sdn Bhd. Moderated by Ts. ChM Dr. Kumuthini Chandrasekaram from Universiti Malaya, the forum explored the role of diversity in fostering scientific progress and equity. Panelists shared personal experiences, highlighting both challenges and opportunities in achieving equity in research. As a token of appreciation, early attendees received vouchers sponsored by the ACS International Malaysia Chapter. The posters of each physical breakfast organizer, along with their breakfast event and the

webinar, are shown below. Looking ahead to GWB2026, the organizing team anticipates an even more dynamic lineup of webinars and breakfast events, continuing to inspire and empower scientists worldwide. Stay tuned for updates and join us in championing equity in science!

Report prepared by
Assoc. Prof. ChM Dr. Lee Hooi Ling
(Universiti Sains Malaysia & ACS Malaysia Chapter)
Assoc. Prof. ChM Dr. Fatimah Salim
(Universiti Teknologi MARA & Institut Kimia Malaysia)

ChemReach: Bringing Chemistry Closer to the Community An Outreach Program by IKM Perak Branch

ChemReach is an outreach initiative organized by the Institut Kimia Malaysia (IKM) Perak Branch, in collaboration with a dedicated team of ten enthusiastic high school students. Held from 31st March to 2nd April 2025, the program was designed to spark interest in chemistry and promote STEM education among underprivileged communities. With a strong commitment to inclusivity, ChemReach carried the inspiring theme "Chemistry for All", underscoring the belief that quality science education should be accessible to everyone, regardless of background. T he three-day event was conducted across three or phanages in Perak:

- Persatuan Kebajikan Anak-anak Yatim Kasih Sayang
- Pertubuhan Badan Kebajikan Anak-anak Yatim Darussalam
- Pertubuhan Pengurusan Pusat Jagaan 1 Malaysia, Perak

Each day's session lasted for half a day, beginning with a warm welcoming speech and an introduction to Institut Kimia Malaysia (IKM), delivered by ChM Dr. Wong Lai Peng, Chairperson of IKM Perak Branch and the Chairperson of the ChemReach program. The program successfully reached out to approximately 80 participants in total, engaging them through a range of interactive, fun, and educational activities.

The highlight of ChemReach was the chemistry experiment demonstrations, where the team presented six exciting and basic chemistry experiments using safe household items. These hands-on demonstrations allowed participants not only to observe the wonders of chemistry but also to actively engage in selected experiments themselves. This approach provided a meaningful and enjoyable learning experience, promoting better understanding and retention of scientific concepts.

In line with the global movement towards sustainability, ChemReach also aimed to raise awareness about the United Nations Sustainable Development Goals (SDGs). Through the lens of chemistry and scientific thinking, the event highlighted the role of science in addressing global challenges such as clean water and responsible consumption.

ChemReach 2025 successfully achieved its mission of making chemistry accessible, engaging and impactful for underprivileged youth. By blending scientific learning with fun, hands-on experiences, the event ignited curiosity and inspired a future generation of scientists, innovators, and changemakers. The program stands as a testament to IKM Perak Branch's dedication to community outreach, educational empowerment, and the vision of a more inclusive and sustainable future.

Prepared by Chaw Cheok Fong (Leader of ChemReach)

Persatuan Kebajikan Anak-anak Yatim Kasih Sayang

Pertubuhan Badan Kebajikan Anak-anak Yatim Darussalam

Pertubuhan Pengurusan Pusat Jagaan 1 Malaysia, Perak

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- **IKM Merit Award**
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- **Outstanding Young Chemist Award**
- **IKM/RSC - Synthomer Award in Polymer Science Sponsored by Synthomer Sdn Bhd**
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President: Datuk ChM Dr. Soon Ting Kueh

MALAM KIMIA 2025
Saturday, 6 December 2025

Malam Kimia 2025 will be held on **Saturday, 6 December 2025** 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 **RM350.00** per person for non-members. Companies are welcomed to book a table for **RM3500.00**.

The closing date for purchase of dinner tickets is **10 November 2025**.

REPLY SLIP

Executive Director
Institut Kimia Malaysia
127B, Jalan Aminuddin Baki
Taman Tun Dr. Ismail
60000 Kuala Lumpur

Date.....

MALAM KIMIA 2025

1. I wish to purchase the following dinner tickets (Fill in the number of tickets in box):

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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 2025 on Saturday, 6 December 2025, 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 2025 to be held on **Saturday, 6 December 2025** 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 2025

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   Non-members / Organization ☐ at RM3500.00 for 10 pax
   Guest (non-member) ☐ at RM350.00 each

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Chemistry's Role in Malaysia Sustainable Development Progress

by Hooi Ling Lee, Chern Wern Hong, Rozana Othman, Vannajan Sanghiran Lee, Mohd Sukor Su'ait, Lai Ti Gew

Chemistry's role in Malaysia's progress achieving the United Nations Sustainable Development Goals (SDGs) is reviewed in a special topic article recently published in *Pure and Applied Chemistry* **[1]. Readers interested in exploring this topic further, should check out [1] and the references provided therein for more comprehensive details.**

Malaysia has started a historic pursuit to mainstream the UN's 17 SDGs and thereby incorporate them into Malaysia's national developmental framework [2, 3]. These initiatives are emphasized by a participatory governance system overseen by the National SDG Council. It is led by the Prime Minister with the support of governmental stakeholders, civil society organizations, and private sector institutions as depicted in Figure 1 [3]. Thus, it is essential to make this approach inclusive to facilitate cooperation and gain a more thorough understanding of how all the goals are interconnected.

The Malaysian government has previously conducted National SDG Symposiums and focus group discussions to engage the stakeholders and enhance their contribution towards the conservation of SDG-related policies and programs. These dialogues have allowed various stakeholders to contribute to the actualization of the SDGs. The engagement of NGOs, and private sectors is imperative as has been taken into consideration by the mapping of the SDs with the Eleventh Malaysia Plan (11MP) to ensure that sustainable development is at the heart of Malaysia's development plan.

Malaysia has also carried out a readiness assessment in terms of data for SDGs and has reviewed where the gaps are in terms of monitoring and reporting on the SDGs. Studying these issues is necessary to establish a solid data set to implement the goals. Resource mobilization through social enterprise, corporate social responsibility (CSR) projects, and public funding within the framework of the 11MP is also an essential aspect of this work. Moving forward, Malaysia continues to support the SDGs, focusing on the decentralisation of the SDG approach by implementing the multi-stakeholder institutional framework at the state level. Such

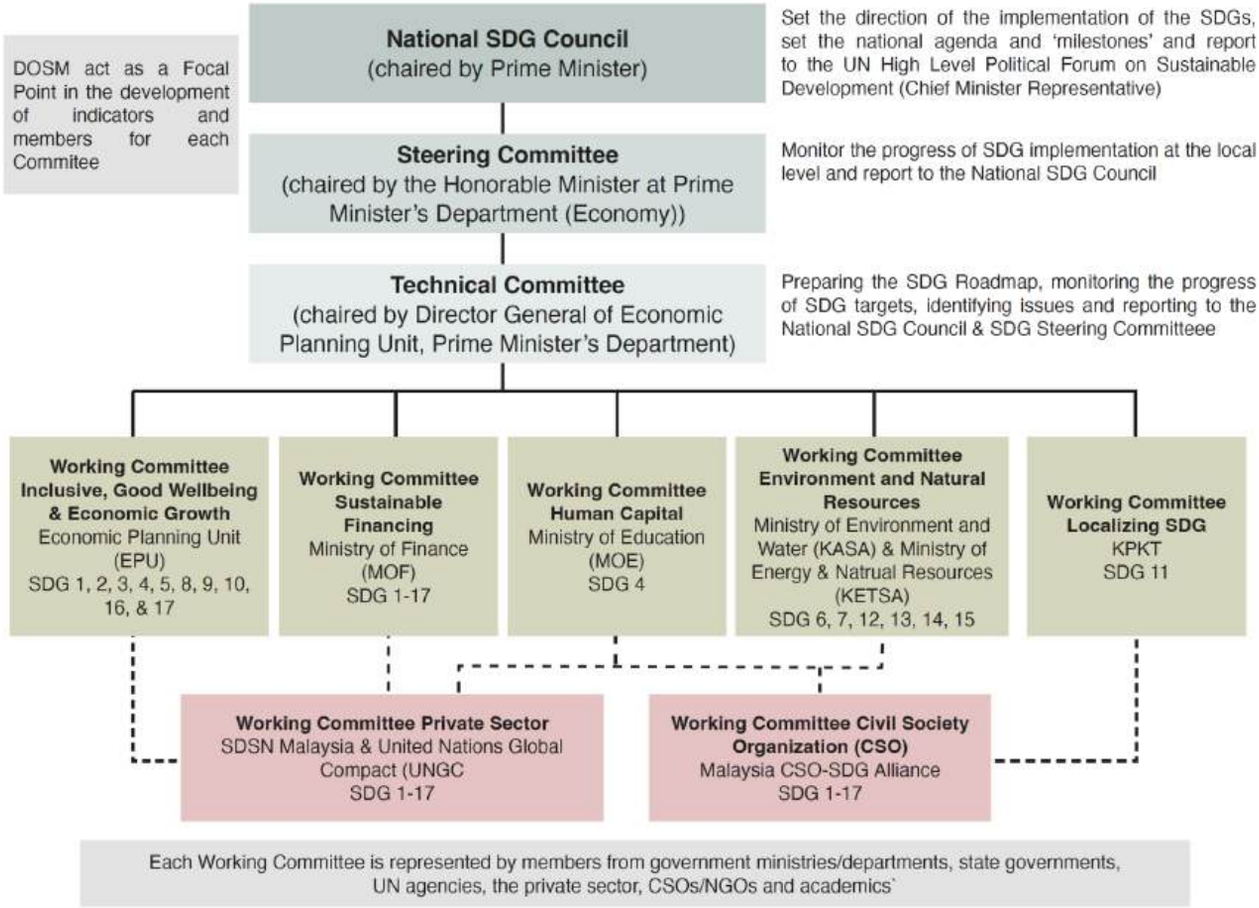

Figure 1: The SDG governance structure in Malaysia [2].

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an approach is consistent with Malaysia's commitment and efforts towards the implementation of the SDGs and the development of sustainable solutions for the rakyat.

In this effort, chemistry remains central to the task of identifying key challenges and opportunities for advancing sustainability. This article explores how chemistry can drive Malaysia's progress towards achieving the SDGs to an environmentally conscious, societally safe, and economically sustainable future.

SDG 3: Good Health and Well-being

SDG 3 emphasizes the importance of good health and well-being for all, a vision which Malaysia has ambitiously embraced. This goal aims to ensure healthy lives across all ages and tackle challenges such as communicable diseases and the need for innovative treatments. Most initiatives that deal with improvements in the quality and enhancement of Universal Health Coverage in Malaysia are led by the Ministry of Health, Malaysia. Target 3.8 emphasizes Universal Health Coverage (UHC), including financial risk protection, access to quality health services, and access to essential medicines.

Malaysia possesses one of the most efficient healthcare systems in Southeast Asia, achieving UHC through heavy government subsidies and large investments in healthcare infrastructure. Consequently, infant and maternal mortality rates have fallen remarkably. The maternal mortality rate has decreased from 43 per 100 000 live births in 1990 to 21.1 in 2020. Neonatal mortality rates have fallen, reflecting improvements in health services, prenatal and postnatal care, and public awareness. Despite such advances, disparities persist in healthcare access, particularly in rural areas and among marginalized communities; targeted interventions will be required to narrow the gap. This, in turn, challenges health care financing in the task of balancing resources with quality while ensuring cost-effectiveness.

Target 3.9 aims to substantially reduce the number of illnesses and deaths from hazardous chemicals and pollution, by demonstrating that chemistry can be a positive force to improve health. Proper management of pollutants and chemicals is essential to public health. Further investment in research and development will help nurture new innovations in medical technology and pharmaceuticals. Chemistry is playing an important role in medical research, starting from the development of drugs up to monitoring the environment; both are important in disease prevention and control, ultimately contributing to a healthier and more resilient society.

SDG 4 & SDG 6: Quality Education & Clean Water and Sanitation

Malaysia has been making progress in achieving both SDG 4 (Quality Education) and SDG 6 (Clean Water and Sanitation), and chemistry is one of the key enablers. Malaysia has incorporated Education for Sustainable Development into the school curriculum since the 1990s, showing commitment towards environmental awareness and global citizenship Chemistry curriculum emphasizes green experiments, while co-curricular activities like Nature Clubs further support environmental education. The efforts have been scaled up by NGOs such as Water Watch Penang, the Global Environmental Centre, and Clean International through school partnerships for water conservation awareness and various education outreach activities.

In the realm of SDG 6, Malaysia has developed a robust water treatment infrastructure, with 344 water treatment plants employing both conventional (Figure 2, [4]) and advanced methods. Chemical processes such as coagulation, flocculation, and chlorination ensure clean water for distribution. Advanced technologies (Figure 3, [5]), including ozonation and titanium dioxide photocatalysts, effectively tackle organic pollutants and heavy metals.

Government agencies like the Department of Irrigation and Drainage and private corporations such as Intel Malaysia contribute significantly to sustainable water management through education, innovation, and conservation initiatives. Malaysia's adoption of the Integrated Water Resources Management (IWRM) strategy and reforms under the Water Services Industry Act 2006 underscore the nation's commitment to sustainability. Through the synergy of NGOs, government agencies, and corporations, Malaysia demonstrates how chemistry can bridge education and environmental

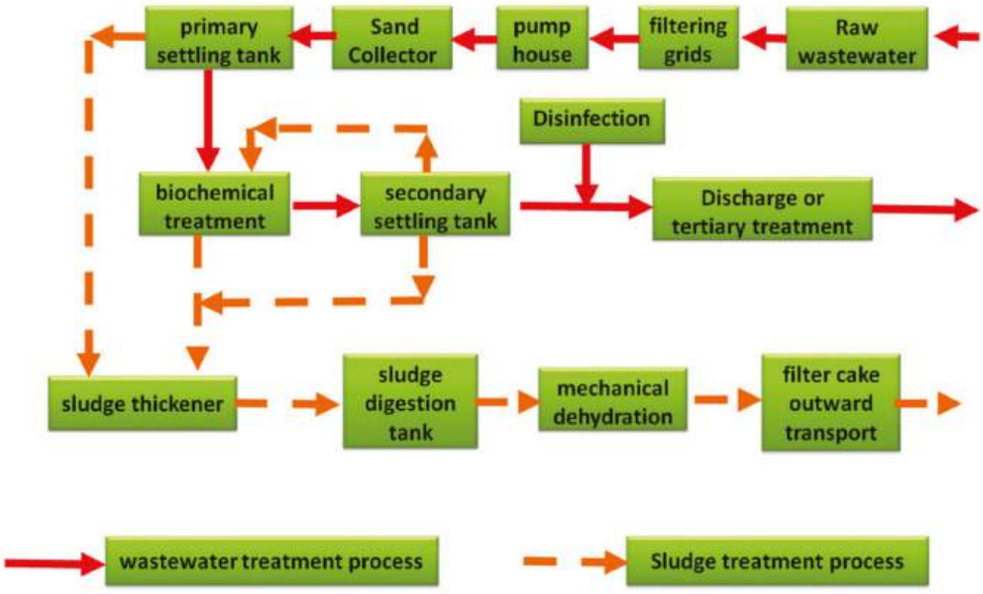

Figure 2: Typical process flow diagram of a wastewater treatment plant (WWTP) [4].

stewardship, ensuring a sustainable future for both its people and water resources.

SDG 7: Affordable and Clean Energy

Malaysia's power consumption is projected to increase threefold by 2050 due to electrification and improved living standards. In achieving carbon neutrality by 2050, Malaysia is transitioning to renewable energy (RE) and clean energy sources. The National Energy Policy (NEP) 2022-2040 targets a 31% RE capacity mix by 2025 and 40% by 2035. Supporting frameworks like the National Energy Transition Roadmap (NETR) launched in August 2023 focuses on six key areas, namely, RE, low-carbon mobility, hydrogen, bioenergy, carbon capture, and energy efficiency.

Solar energy leads the RE sector, with installed capacity growing from 0.1 GW to 2.6 GW since 2011 and further expansion on initiatives like Net Energy Metering and Feed-in Tariff programs have driven cost reductions and increased solar competitiveness. As of 2023, Malaysia's installed RE capacity reached 25%, progressing towards its 31% goal. Biomass, mainly from palm oil waste, also plays a role, supported by initiatives like the National Biomass Action Plan (NBAP) 2023 – 2030 and biodiesel programs. The transport sector, responsible for 25-30% greenhouse gas (GHG) emissions, is undergoing reforms through the Low Carbon Mobility Action Plan (LCMB). This target is promoting public transport, expanding electric vehicle charging infrastructure to support broader EV adoption, and developing hydrogen energy hubs to reduce GHG emissions.

Challenges persist, including RE intermittency and the need for battery energy storage systems (BESS) to stabilize the grid. Malaysia intends to adopt 500 MW of BESS to enhance energy reliability. Collaborative efforts, advanced green technologies, and improvement in regulatory are essential to drive the energy transition. Initiatives such as the Bursa Carbon Exchange will greatly contribute to sustainable development through facilitation of carbon credit transactions. Thus, innovation and partnership are the keys in the journal of Malaysia toward net zero carbon emission for economic and environmental advancement by 2050.

SDG 9: Industry, Innovation, and Infrastructure

Chemistry underpins Malaysia's efforts to develop resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation. The chemical industry in Malaysia covers a wide range of sectors, from petrochemicals, oleochemicals, and specialty chemicals to pharmaceuticals, semiconductors, and quantum computing.

The semiconductor industry, a cornerstone of Malaysia's economy, heavily relies on advancements in chemical processes. With the presence of multinational companies such as Intel, Texas Instruments, and Infineon Technologies, Malaysia has become a part of the key global supply chain for semiconductor. Innovations in chemical engineering are crucial in the development of high-purity silicon wafers, photolithographic chemicals, and advanced materials like gallium nitride and silicon carbide for next-generation chips.

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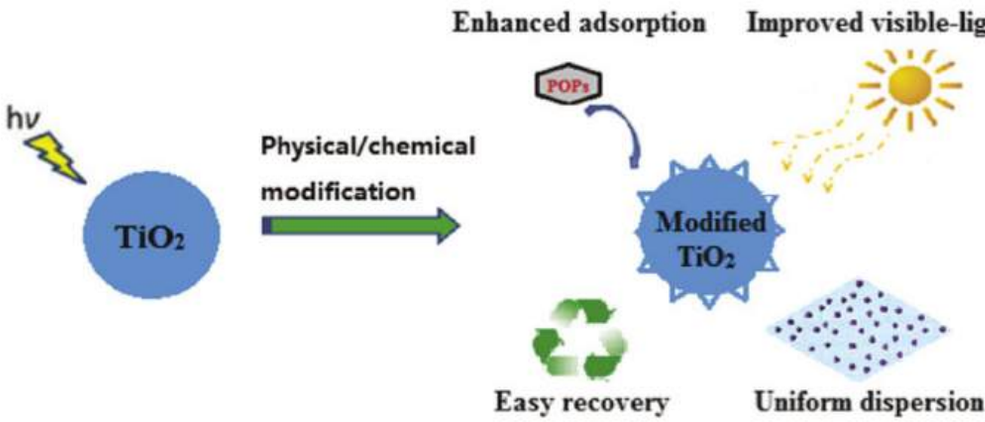

Figure 3: Advanced wastewater treatment processes using ozonation and titanium dioxide photocatalysts [5].

Collaborations between industry and academia, such as Universiti Sains Malaysia (USM), Universiti Malaya (UM), Universiti Teknologi MARA (UiTM) with Infineon, have driven research in developing sustainable and energy-efficient semiconductor materials. This sector contributed significantly to Malaysia's electrical and electronics industry, which accounted for 5.8% of GDP in 2023, with export earnings projected at RM495 billion by 2025. Sustainable practices include water recycling and introduction of green solvents could be incorporated into greener semiconductor manufacturing to reduce its environmental footprint.

Another cutting-edge technology merging with chemistry is the quantum computing sector in Malaysia. Quantum chemistry, which involves simulating molecular systems using quantum computers, is revolutionizing drug design, material discovery, and solutions to environmental issues. Malaysia's collaboration under Center of Excellence in Quantum Information Science and Technology (COE QiST), Universiti Malaya with Xanadu, a Canadian quantum computing company, underlines the commitment of the country to integrating quantum technologies into its ecosystem. The collaboration will develop algorithms in molecular modeling that will increase efficiency in the design of new materials for batteries, semiconductors, and pharmaceuticals. This initiative aligns with Malaysia's vision for a highly skilled workforce in high technology and its positioning to become the leading player in quantum innovation within Southeast Asia.

Specific projects such as Petronas's ventures into quantum-enhanced materials discovery demonstrate how chemistry and quantum computing converge to solve some of the challenges facing energy storage and green energy solutions today. These efforts also complement the strides Malaysia is making in the oil and gas industry, which contributes RM300 billion to the GDP annually, and the palm oil industry, with exports valued at approximately RM137 billion in 2022. Chemistry is leading the transformation through sustainable chemical innovations in production processes for the benefit of both industries.

The palm oil industry, a vital sector in Malaysia, also illustrates how chemistry can contribute to sustainability. Efforts include converting palm oil waste into biofuels and bioplastics, reducing reliance on fossil fuels and mitigating environmental degradation, while also supporting SDG12 (Responsible Consumption and Production). Such innovations reduce the carbon footprint and further the circular economy, hence promote climate action due to deforestation and land-use change.

Water resource management is another critical area where chemistry is having a major impact. Advanced chemical technologies in water treatment, such as green membrane filtration and chemical adsorption processes, help improve access to clean water and sanitation, hence contributing to clean water and sanitation sustainable goals. These efforts protect marine biodiversity, aligning with SDG14 (Life Below Water) by preventing industrial pollutants from entering aquatic ecosystems.

SDG 11: Sustainable Cities and Communities

As the urban population of Malaysia is growing, sustainable urban development is crucial to meet the needs of 78.2% of its residents residing in cities while addressing environmental, social, and economic sustainability. In the year 2020, Selangor was reported as the most populous state in Malaysia, comprising a population of 6.7 million, whereas Sabah had the highest rural population, amounting to 1.55 million. SDG 11 focuses on developing cities to meet the immediate needs of residents while promoting environmental, social, and economic sustainability. Active participation and partnership of stakeholders is required, including national and state governments, local councils, the private sector, the public, and individuals are essential to

create a sustainable city for all.

Chemistry plays an important role in the achievement of SDG 11. Analytical chemistry and instrumentation are essential for monitoring air and water quality, ensuring compliance with environmental standards, and safeguarding public health. Wastewater treatment processes rely on chemistry to remove pollutants, making treated water safe for environmental release. Life Cycle Assessments (LCA) help evaluate the environmental impact of materials and processes, promoting sustainable resource use and reducing environmental burdens.

The 12 Principles of Green Chemistry guide the development of eco-friendly materials and processes, reducing hazardous material use and waste generation. For instance, creating weather-resistant materials can help cities become more resilient to natural disasters like floods and landslides, while promoting sustainable raw material consumption and waste management. Chemistry also contributes to the development of alternative fuels, electric vehicles, and chemical recycling technologies, reducing air pollution and traffic congestion. Encouraging public transport, walking, and cycling further reduces greenhouse gas emissions and promotes health. Green spaces and communal areas foster mental well-being and social interactions, while sustainable urban design ensures inclusive access to healthcare, education, and job opportunities. Initiatives like Kuala Lumpur's Car-Free Morning highlight the co-benefits of reducing air pollution and encouraging physical activity.

In collaboration with stakeholders, chemistry underpins innovations that drive urban sustainability, mitigating climate change impacts while fostering healthier, more resilient communities.

SDG 12: Responsible Consumption and Production

Malaysia's rapid urbanization and economic growth have driven increased consumption and waste generation, posing significant environmental challenges. Malaysia has established frameworks like the National Solid Waste Management Policy and Solid Waste and Public Cleansing Management Act 2007 to promote recycling and reduce waste. Despite efforts, the recycling rate is only 31%, trailing behind regional neighbors. The government aims to achieve a 40% recycling rate by 2025. Chemistry-driven innovations can help Malaysia meet this target by improving recycling infrastructure and waste separation practices. Municipal Solid Waste (MSW) management remains a challenge, with food waste constituting 44.5% of MSW in 2016. Inefficient waste management infrastructure has resulted in environmental crises, such as the "Sungai Kim Kim Chemical Waste Pollution incident" in 2019. Chemistry is crucial in advancing sustainable practices and addressing these issues in line with SDG 12.

Chemistry enables the efficient recycling of plastics, metals, and paper by breaking down materials into their fundamental components and recovering valuable chemicals from hazardous waste. Innovations like biodegradable plastics and chemical recycling technologies reduce plastic pollution and minimize landfill dependency. The knowledge of Chemistry is incorporated in developing sustainable materials like biodegradable plastics and promotes life cycle assessments to measure environmental and economic impacts. It is worth noting that biotechnology programs under the National Biotechnology Policy 2.0 and the Bioeconomy Transformation Program focus on research and innovation in biomaterials that may lead to sustainable industrial practices. Thus, Chemistry plays a fundamental role in achieving responsible consumption and production through research, innovation, and policy support, ensuring a balance between environmental sustainability and economic growth.

SDG 13 Climate Action

Malaysia must address climate challenges from rising temperature and extreme weather to sea-level rise through a dual approach of adaptation and mitigation. The country is investing in climate-resilient infrastructure, enhanced drainage systems, green urban projects, and resilient transport networks to reduce these risks. Besides, biodiversity conservation helps to enhance ecosystem resilience and provide services such as carbon sequestration and water purification. Community engagement furthers resilience and sustainable development.

Chemistry takes center stage in Malaysia's climate mitigation strategy through innovation and the development of sustainable solutions to address environmental challenges. These include the development of renewable energy, carbon capture and storage (CCS) systems, and the decomposition of greenhouse gases. CCS technology captures carbon dioxide (CO_2) emissions from industrial processes and power plants for storage in geological reservoirs or conversion into products like methanol. Petronas, a leading Malaysian energy company, has outlined a decarbonization roadmap utilizing CCS technologies, aligned with the NETR. Additionally, innovative catalytic processes, such as using hydrated K^+ ions and TiO_2 photocatalysts, are

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being explored to decompose nitrous oxide (N_2O), a potent greenhouse gas, effectively.

The 2023 ACS Global Innovation Imperatives (ACS Gii) in Malaysia shed light on computer technology applications in chemistry for better air quality management. It focuses on building community resilience in response to climate conditions and further strengthens national goals related to climate policy.

Malaysian chemical research focuses on novel materials to tackle greenhouse gases and volatile pollutants. The country implements various strategies such as using TiO_2 coatings on infrastructure to reduce N_2O emissions and incorporating advanced catalysts that demonstrate a commitment to sustainable solutions. These innovations, combined with biodiversity conservation and infrastructure resilience, demonstrate Malaysia's commitment to addressing climate challenges. Malaysia endeavors through the application of chemical science along with community action towards a sustainable and climate-resilient future.

SDG 14: Life Below Water

As a coastal nation, Malaysia is deeply tied to its marine biodiversity, yet it faces significant challenges from marine pollution, including microplastics, oil spills, pesticides, and sewage effluent. To combat these issues, Malaysia's Department of Environment (DOE), under the Ministry of Natural Resources, Environment, and Climate Change (NRECC), has been monitoring marine water quality since the 1970s using chemical analyses. Backed by legislation such as the Environmental Quality Act of 1974, the DOE enforces pollution control to safeguard marine ecosystems.

As such, Chemistry is at the forefront in Malaysia's marine conservation efforts. For example, coral reefs, vital to marine biodiversity, are severely impacted by ocean acidification caused by carbon monoxide (CO_2) emissions, which disrupt nutrient cycling and calcification processes. Recognizing this, the Department of Marine Park Malaysia and Reef Check Malaysia initiated coral restoration programs in 2011 following a mass bleaching event. The emerging field of marine biotechnology further highlights chemistry's importance. Malaysia's diverse marine ecosystems, particularly in Sabah, offer potential for discovering marine natural products (MNPs)—bioactive compounds with unique chemical properties that hold promise for pharmaceuticals, biotechnology, and environmental applications. By leveraging chemistry for pollution monitoring, coral reef restoration, and marine biotechnology, Malaysia is actively advancing SDG 14 (Life Below Water). Through increased regulatory measures and sustainable practices, Malaysia demonstrates its commitment to preserving marine biodiversity, reducing pollution, and ensuring a sustainable ocean environment for future generations.

SDG 15: Life on Land

SDG 15 focuses on the conservation, restoration, and sustainable use of terrestrial ecosystems; sustainable management of all types of forests; and halting biodiversity loss. Malaysia is one of the world's 17 megadiverse countries. It measures 329,613 km² and more than 60% of Sabah and Sarawak are covered by forests while in Peninsular Malaysia, over 44.7% of the land is covered with forests. The incredible richness in biodiversity comprises an estimated 15,000 species of vascular plants, 306 mammal species, and 742 bird species among many others in most other taxa.

Malaysia steers its path of conservancy through laws such as the Wildlife Act, the Forestry Act, and the National Biodiversity Policy 2015–2025. Malaysia has pledged to maintain at least 50% of its land under forest and tree cover during the Rio Summit in 1992 and has shown commitment to this pledge by maintaining 57.9 % of forest cover as of 2022. At global standing, Malaysia has become a part of various international environmental instruments in pollution, climate change, hazardous waste management, ozone layer protection, and many others. Various steps have been implemented in the local landscape including key elements of biodiversity management such as bioprospecting; nature-based tourism; and endangered species protection. Inevitably, there are challenges ahead, most of all with the heavy burden of deforestation largely attributed to agricultural activities and urban development.

The traditional chemical innovations have contributed much to improving the quality of life, however, they have largely ignored the environmental impact. Hence, a move to sustainable or green chemistry is required that emphasizes product and process design with reduced hazards but equal performance. This would require a new set of criteria for measuring performance where environmental factors are included. In line with this, by incorporating sustainable practices (as recommended by Zimmerman *et al.;* Figure 4) into the framework of chemical research, chemists can avoid pollution and restore ecosystems, which correspond to Malaysia's objective under SDG 15, while aiding in the country's commitment to the conservation of biodiversity.

SDG17: Partnerships for the Goals

Malaysia's success in sustainable development is deeply rooted in its collaborative approach. Partnerships

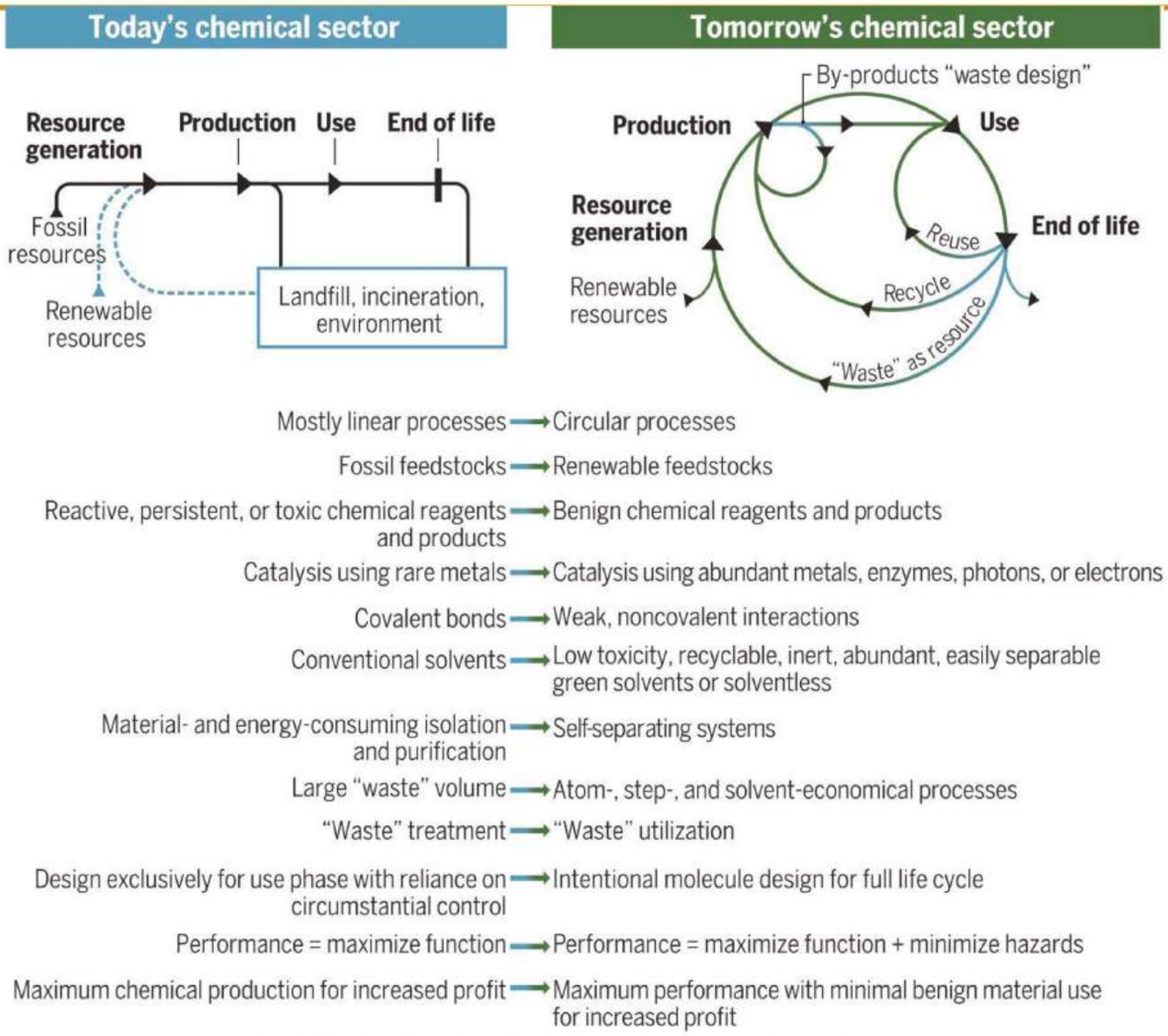

Figure 4: Characteristics of today's and tomorrow's chemical sectors.

have been integral to advancing semiconductors, quantum computing, and other key industries. These collaborations also drive progress across environmental sustainability, health, and energy sectors. For example, Malaysia's participation in the Regional Comprehensive Economic Partnership (RCEP) has strengthened trade ties and technological collaborations with countries like Japan, South Korea, and China, fueling advancements in semiconductor manufacturing. This partnership has enhanced the region's collective capability to develop sustainable technologies that support industry, innovation, and infrastructure.

In the quantum computing domain, the partnership between Universiti Malaya under Center of Excellence in Quantum Information Science and Technology (COE QiST), Xanadu, and MyQI (Malaysia Quantum Initiative) serves as a model for cross-border collaboration. This initiative focuses on creating educational programs and practical workshops to upskill researchers and industry professionals, enabling Malaysia to develop a quantum-ready workforce. Additionally, collaborations with institutions like the Quantum Technology and Future Computing Group (QTFT.org) have further bolstered Malaysia's capacity for quantum research, emphasizing the synergy between chemistry and computational science. These partnerships have direct implications for SDG13: Climate Action, as quantum-enhanced simulations can optimize clean energy systems and reduce industrial emissions.

Partnerships with the services sector, which accounted for 59.2% of Malaysia's GDP in 2023, are also crucial. Collaborations with global firms in ICT and tourism sectors have spurred innovation in sustainable practices, especially in chemical applications for infrastructure development and energy efficiency. These projects contribute to building Sustainable Cities and

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Communities (SDG11) through green infrastructure and low-emission building materials.

Renewable energy initiatives also benefit from international partnerships. Collaborations between local companies and global firms aim to enhance solar energy technologies, bioenergy production, and hydrogen storage, directly supporting affordable and clean energy. Petronas's development of quantum computing applications for energy solutions, including hydrogen fuel storage, reflects Malaysia's leadership in sustainable energy research.

Outlook

Malaysia has consciously positioned itself in line with the UN SDGs by emphasizing the four areas of chemistry, education, partnership, and engagement. Due to the disparity of cultures, society, and economy in Malaysia, it is important to have local participation in combating global issues such as climate change. Community engagement in local climate change adaptation and mitigation taps into local support, knowledge, and inputs developing local ownership and solutions. However, drawbacks like the absence of awareness, constraints in education and the economy, and regulatory problems hamper the progress of green chemistry. This is because the different stakeholders fail to understand the advantages that come with green chemistry. Large initial investment is also a challenge that has been observed in the process of implementation. Furthermore, current policies and regulations do not facilitate or require green chemistry practices to be adopted on a large scale.

Several steps are required to address these issues. A strategic course is to give incentives for green chemistry, formulate regulations minimizing the exposure of hazards, and create forums for information sharing among stakeholders and the public on potential hazards. Interventions with government sectors, educational institutions and communities could enhance making the cities safe, clean, livable, resilient, and sustainable.

With these aspirations, Malaysia aims to unlock existing opportunities and overcome barriers to achieve the sustainable development goals set by the country for a green future. Grounded in chemistry and cooperation with various communities, Malaysia is committed to creating a sustainable future for everyone.

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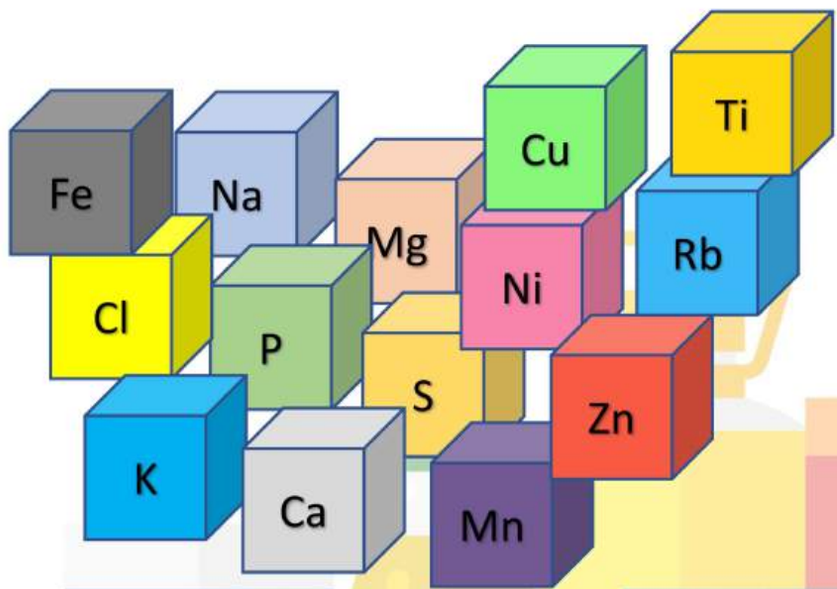

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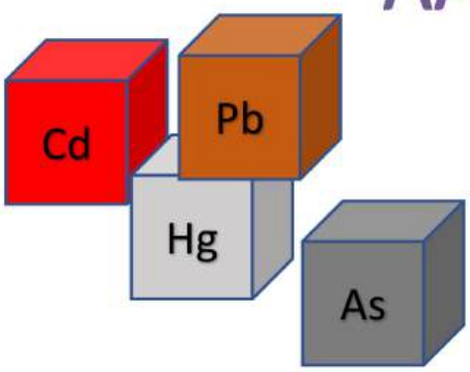

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SPEAKERS

Ms. Komathi Mariyappan, *Founder & Director - Climatera Consulting Sdn Bhd*
AREAS OF EXPERTISE: GHG Inventory (UNFCCC/IPCC), Carbon Footprint for Cities, Corporates, Events (GHG Protocol/other standards), GHG Management System (ISO System), Life Cycle Assessment (GHG Emissions), Carbon Trading/Offsets (Compliance & Voluntary), Domestic Carbon Project Development (Tech based, NBS & REC) Sustainable Reporting (GRI Guideline), Capacity Building & Training: GHG Inventory.

Dr. Gary Theseira, *Adjunct Associate Professor at the Asia School of Business (ASB), a Director and Council member at Climate Governance Malaysia (CGM)*
AREAS OF EXPERTISE: Corporate Sustainability, ESG compliance and the SDGs, Climate Risk Management, Forest Carbon Quantification. Currently assists the Joint Committee on Climate Change (JC3) on the development of National Climate Data Catalogue and serves on the National Climate Change Advisory Panel and the Selangor State Action Council on Climate Change (IKLIM) as a subject matter expert.

Mr. Hiro Chai Yihn Chan, *Director - Mitsusho Sdn. Bhd.*
AREAS OF EXPERTISE: Global Investment Banking and Carbon Market, Readiness Assessment in Accordance with Securities Commission, Bursa Carbon Exchange (BCX), Sustainability Reporting, Corporate Carbon Offsetting, Carbon Credit Project Development, Validation on GHG Inventory and Product Life Cycle against ISO:14064 and ISO:14067.

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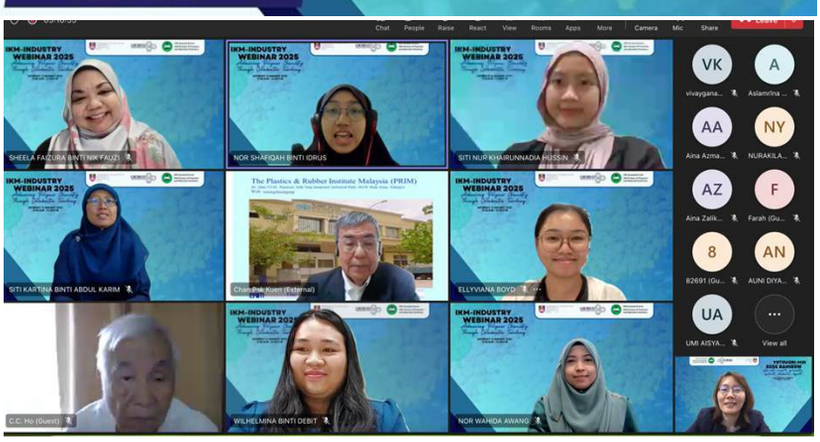
IKM-Industry Webinar 2025

The IKM-Industry Webinar 2025, with the theme "Advancing Polymer Chemistry Through Collaborative Teaching", was jointly organised by IKM Sarawak Branch, IKM Division of Polymers & Materials Chemistry (DPMC), Universiti Teknologi MARA (UiTM) Sarawak Branch and CHEMISTS UiTM Sarawak. The webinar was successfully held virtually on the Microsoft Teams platform, involving 137 participants including students and academics from Faculty of Applied UiTM Sarawak and other UiTM branch campuses, Universiti Malaysia Sarawak (UNIMAS) as well as IKM members. The webinar kicked off with a welcoming remark by the Head of Centre of Studies of Applied Sciences, Ts. Dr Siti Kartina Abdul Karim.



The first Sharing Session was delivered by Professor ChM Dr. Sim Siong Fong, who is the Chairperson of IKM Sarawak Branch, highlighting the role of IKM as a statutory professional organization for Chemists and the past and ongoing activities by IKM Sarawak. Meanwhile, in Sharing Session 2, Mr. Chan Pak-Kuen, a Fellow of the Plastics & Rubber Institute of Malaysia (PRIM), offered valuable insights into the rubber and polymers industry. The webinar emphasized the vital role of the professional organization and the polymer industry in promoting innovative teaching and learning, providing a platform for knowledge exchange and collaborative advancement in polymer chemistry.

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KPT/JPT(R2/720/7/0049)06/2026 | MQA/A10618,
KPT/JPT(R2/721/8/0043)01/2027 | MQA/A3767

COMMENCEMENT
March & September

TOTAL DURATION
1 year (full-time),
2 - 6 years (part-time)

TUITION FEES AT IMU
Conventional
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International: RM 55,900

ODL
Malaysian: RM 44,830
International: RM 44,830

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KPT/JPT(R2/545/7/0078)07/2027 | MQA/FA1299
KPT/JPT(N-DL/545/7/0101)09/2025 | MQA/SWA11357

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ENGLAND
Queen Mary University of London
Malta Campus

COMMENCEMENT
March & September

TOTAL DURATION
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2-6 years (part-time)

MSc in Molecular Medicine (IMU) and **MSc in Genomic Medicine (QMUL)**:
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4 years (part-time)

TUITION FEES AT IMU
Conventional
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International: RM 52,000

ODL
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International: RM 41,600

PHARMACY PRACTICE (Master)

KPT/JPT(R2/0916/7/001)03/2029 | MQA/SWA02796

COMMENCEMENT
March & September

TOTAL DURATION
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2 – 6 years (part-time)

TUITION FEES AT IMU
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International: RM 52,000

MEDICAL AND HEALTH SCIENCES (MSc / PhD)

KPT/JPT(R2/720/7/0049)06/2026 | MQA/A10618
KPT/JPT(R2/721/8/0043)01/2027 | MQA/A3767

COMMENCEMENT
Throughout the year

TOTAL DURATION
MSc:
1 year (full-time)
2 years (part-time)

PhD
3 years (full-time),
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TUITION FEES AT IMU
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International: RM 10,750

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International: RM14,050

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Evidence-based practice – II	1	RM1,000	Master in Pharmacy Practice
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Cosmetics and Cosmeceuticals	1	RM500	Standalone
Quality Management and Regulatory System	N/A	RM200	Standalone
Immunology and Infection	2	Public - RM1,800 Alumni/Student - RM1,440	MSc in Molecular Medicine

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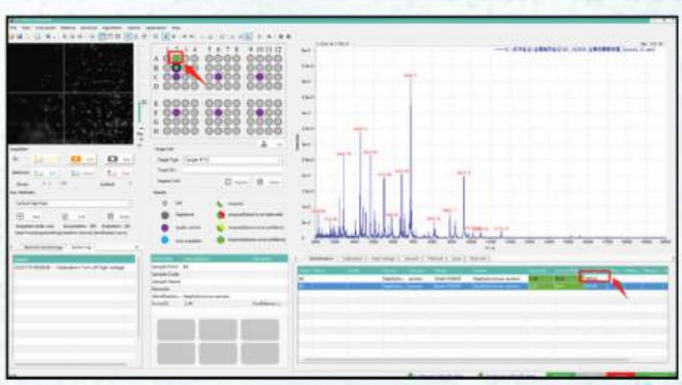
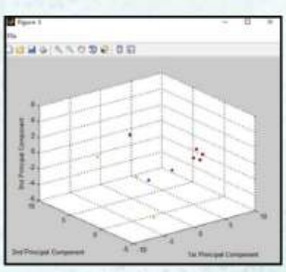
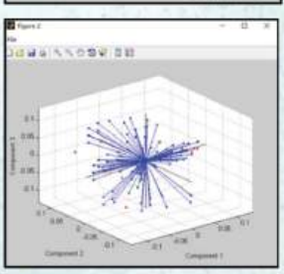
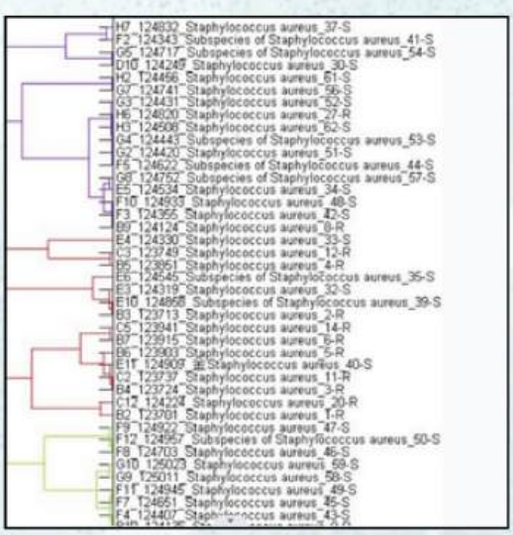


4. The system can intelligently identify and correct the ±10 Da of the spectrum offset with synchro nous searching during the process and the detection result will be obtained within 0.1s.







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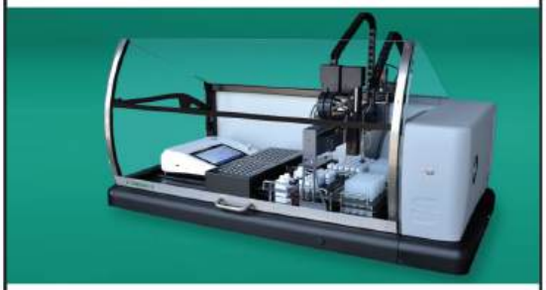

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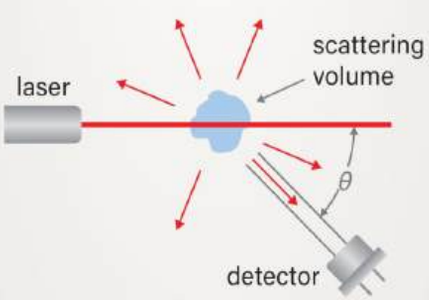

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- **Optional:**
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- 5 speed blower control based on air quality level
- Durable chemical-resistant blowers

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- Intuitive user interface for enhanced user convenience
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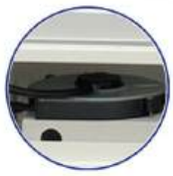
360° articulating arm for easy positioning of the snorkel at the source of harmful gas emissions

AIoT Function

Seamless integration with equipment for automated control (supports web or app-based control)

Toxic Gas Monitoring

Automated operation based on continuous monitoring of VOC levels within the laboratory



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- **Compact Design**
- **User-Friendly**

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- Nutrition and Nutrient Analysis
- Environmental Contaminants/monitoring
- Food Contaminants/monitoring
- Food & Beverages Testing
- Genomics/Metabolomics/Lipidomics
- Protein & Peptides
- Doping & Veterinary Testing Labs

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Spark new insights with the Thermo Scientific™ Cindion™ Combustion Ion Chromatography (C-IC) System

Laboratory professionals in Malaysia and around the world can now perform analysis of total halogens and sulfur in difficult-to-analyze samples with the new Thermo Scientific Cindion Combustion Ion Chromatography (C-IC) System.

This fully-integrated C-IC system can be used to screen for potentially corrosive and toxic halogens and sulfur, helping laboratory professionals ensure high-quality standards to safeguard products and the environment.

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- Corrosives and sulfur in petroleum products
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- Banned substances in plastics and electronics
- Corrosives in mining samples

Thermo Scientific Cindion Combustion Ion Chromatography System

Learn more at:
thermofisher.com/cindion

NEW

Interactive Infographic On Thermo Scientific Cindion Combustion Ion Chromatography System

Access the interactive infographic to click through each of the 5 process stages to understand how this innovative analytical technique works.

Access this infographic at:

Knowledge Exchange

Thermo Fisher Scientific invites scientists, researchers, chemists, and other laboratory professionals in Malaysia to connect, learn and exchange knowledge with experts worldwide in our virtual learning sessions on topics relating to combustion-ion chromatography (C-IC).

Webinar: Spark New Insights! Boost Your Lab's Power With Combustion-Ion Chromatography

Combustion-ion chromatography (C-IC) has become an indispensable tool to screen solid, liquid, and gas samples for corrosive and toxic halogens and sulfur constituents across a variety of industries, such as environmental, industrial, and food and beverage.

We invite lab professionals in Malaysia to learn about the latest advancements in C-IC as we unveil our new C-IC system at our exclusive launch event.

Topics that will be covered include:

- How combustion-IC works. Understand the principles behind combustion-IC and its unique capabilities in detecting corrosive and toxic halogens, sulfur, and more.
- An introduction to our new C-IC system. Explore the innovative features and benefits of our fully integrated C-IC system, designed to provide reliable and sensitive analysis.
- Applications and benefits. Discover the wide range of applications of this system, including screening for PFAS following US EPA Method 1621.

Register for the webinar at:

Ask The Experts: FAQs on Combustion IC

IC experts from Thermo Fisher Scientific answer commonly asked questions on Combustion IC, from sampling to instrumentation.

Access these short educational videos at:

Ask the Experts: Combustion IC for PFAS screening

Our IC experts answer FAQs on utilizing Combustion IC to screen for PFAS compounds in water.

Application Spotlight

We focus on driving food safety and environmental health through accurate and reliable analytical techniques using the new combustion-ion chromatography system.

Application Note: Screening of per- and polyfluoroalkyl substances (PFAS) in food contact materials: Utilizing a new combustion-ion chromatography system for total organic fluorine (TOF) analysis

Per- and polyfluoroalkyl substances (PFAS) have been intentionally added to food contact materials (FCM) for decades to confer grease and water repellency. PFAS are highly persistent, bioaccumulative, and toxic. Consequently, the use of PFAS in FCM presents significant concerns related to direct human exposure and environmental pollution at the end of their lifecycle.

In response to these concerns, twelve states in the United States have or will legislate the use of PFAS in food packaging due to the absence of federal action. For example, California has banned all plant fiber-based food packaging containing PFAS that are either intentionally added or present at levels exceeding 100 parts-per-million (ppm) total organic fluorine (TOF), effective January 1, 2023.

In Thermo Scientific Application Note AN003644, we developed a method to measure TOF in FCM using combustion-ion chromatography (C-IC).[1] This application proof note demonstrates the determination of TOF in FCM using an enhanced C-IC system. The Thermo Scientific™ Cindion™ C-IC System combines the Thermo Scientific™ Dionex™ Inuvion™ IC System, featuring reagent-free ion chromatography (RFIC™), with the Thermo Scientific™ Cindion™ Combustion/Absorption Module. The system is optimized for increased combustion efficiency by incorporating a z-fold combustion tube to introduce oxygen at multiple points. As a result, the combustion tube and furnace are shorter, and combustion times are reduced. This also results in a smaller footprint, saving valuable bench space. Additionally, the C-IC system is controlled by a single software, the Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS), enhancing data processing and system management efficiency.

Download the full application note at:

Reference: [1] Jingli Hu, Richard Cochran, Cynthia Grim, Neil Rumachik (2025) Application Note AN003644: Comprehensive screening of per- and polyfluoroalkyl substances (PFAS) in food contact materials; Utilizing combustion ion chromatography for total organic fluorine (TOF) analysis, Thermo Fisher Scientific, Sunnyvale, CA, USA.

White Paper: Enhancing the efficiency and effectiveness of halogen and sulfur monitoring in challenging environmental and industrial samples

Halogens, such as fluorine, chlorine, bromine, iodine, and sulfur compounds, are prevalent in various industries, including consumer product manufacturing, petroleum refining, and chemical manufacturing. These elements and compounds can influence corrosion rates, catalytic efficiency, and the safety of operations, making their monitoring essential for optimal process control. Additionally, the emerging need to screen for per- and polyfluoroalkyl substances (PFAS) in various environmental and consumer product sources has heightened the importance of halogen determinations. PFAS, a group of fluorinated compounds, is increasingly recognized for their persistence in the environment and potential health risks.

This white paper provides a comprehensive overview of the methodologies and best approaches for the determination of halogens and sulfur in challenging industrial and environmental samples, equiping laboratory professionals to implement accurate and reliable analytical techniques.

Download the white paper at:

Technology Spotlight

We discuss the integration of an ion chromatography (IC) system featuring reagent-free ion chromatography (RFIC) with a combustion-ion chromatography (C-IC) for a versatile 2-in-1 operation capability.

Technical Note: Configuring the Thermo Scientific Cindion C-IC system for a 2-in-1 operation: Seamless switching between combustion-IC and standalone IC with an AS-AP autosampler

In Thermo Scientific Application Note AN003644, a method was developed to measure total organic fluorine (TOF) in food contact materials (FCM) using combustion-ion chromatography (C-IC).[1] In this method, total inorganic fluorine (TIF) was measured by directly injecting water-extracted samples through four external injection channels. This approach, while effective, required large sample volumes and manual sample changes after every four analyses.

The Thermo Scientific™ Cindion™ Combustion Ion Chromatography System integrates the Thermo Scientific™ Dionex™ Inuvion™ Ion Chromatography System, featuring reagent-free ion chromatography (RFIC), with the Thermo Scientific™ Cindion™ Combustion/Absorption Module. This integration provides versatile 2-in-1 operation capability, enabling seamless switching between combustion-IC and standalone IC with a Thermo Scientific™ Dionex™ AS-AP Autosampler. With this system, TIF analysis can now be fully automated, eliminating manual sample changes and minimizing sample volume usage, as described in Thermo Scientific Application Proof Note AP003822.[2]

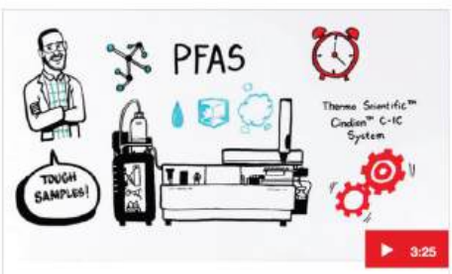
Moreover, when the Cindion combustion/absorption module is not in use, the standalone IC with the Dionex AS-AP autosampler can be employed for other IC applications, thereby maximizing the utilization of the IC system. This technical note provides step-by-step instructions for configuring the Cindion C-IC system for 2-in-1 operation.

By following the provided step-by-step instructions for configuring the system, users can ensure a smooth transition between applications, thus maximizing both efficiency and productivity.

Download the full technical note at:

References: [1] Hu, J, Cochran R, Grim C, Rumachik N (2025) Application Note AN003644: Comprehensive screening of per- and polyfluoroalkyl substances (PFAS) in food contact materials: Utilizing a combustion ion chromatography for total organic fluorine (TOF) analysis, Thermo Fisher Scientific, Sunnyvale, CA, USA. [2] Hu J, Rumachik N (2025) Application Proof Note AP003822: Comprehensive screening of per- and polyfluoroalkyl substances (PFAS) in food contact materials: Utilizing a new combustion ion chromatography for total organic fluorine (TOF) analysis, Thermo Fisher Scientific, Sunnyvale, CA, USA.

What is combustion ion chromatography?



See what the Cindion C-IC System can do

Discover how this fully-integrated combustion IC system can help your lab tackle halogen and sulfur analysis in a variety of complex samples.

Halogens (fluorine, chlorine, bromine, iodine) and sulfur are potentially corrosive, hazardous chemicals that contribute to environmental pollution. However, determining these analytes in petrochemicals, gaseous samples, solid samples, and complex chemicals cannot be easily done using conventional ion chromatography (IC) and the sample preparation required can be costly and labor intensive.

Combustion IC (C-IC) is a hyphenated IC technique that reduces the time and labor for determination of halogens and sulfur in difficult samples by eliminating these complex sample preparation steps. This automated technique is sensitive, saves time, and produces fewer environmental contaminants than other sample preparation techniques, such as acid digestions or back extractions from organic solutions.

Learn more through this white board animation at:

IKM NEW MEMBERS & MEMBERSHIP UPGRADING

New Members (MMIC)		
Adilla Nadzirah Binti Sabri, ChM *M/6984/11230/25*	Maisarah Binti Abdullah, ChM *M/6957/11188/25*	Nordhatul Adibah Bt Mohd Shaharuddin, ChM *M/7041/11318/25*
Ahmad Daniel Bin Mohd Rosli, ChM *M/7046/11326/25*	Mazlinah Binti Atun, ChM *M/7044/11322/25*	Nur Airul Ain Binti Ashri, ChM *M/7029/11302/25*
Aina Mardziah Binti Ahmad Rifa'i, ChM *M/6954/11181/25*	Mazni Binti Musa, ChM *M/7000/11252/25*	Nur Amira Binti Amat, ChM *M/6990/11241/25*
Aini Munirah Binti Muhamad Shud, ChM *M/7032/11306/25*	Melody Anak Kimi, ChM Dr. *M/7026/11291/25*	Nur Izzati Binti Bahran, ChM *M/7017/11281/25*
Aizat Bin Abdul Malek, ChM *M/6998/11249/25*	Meor Muhammad Luqman Bin Meor Ahmad Hisham, ChM *M/6999/11251/25*	Nur Khairul Syazwani Binti Mohamed, ChM *M/6994/11245/25*
Allysha Riziana Binti Reduan, ChM *M/7035/11312/25*	Micklin Melson, ChM *M/7043/11321/25*	Nur Rahimah Binti Said, ChM Dr. *M/6979/11224/25*
Amirah Binti Md Deni, ChM *M/6963/11197/25*	Mohamad Azrul Bin Mahdzir, ChM *M/7007/11264/25*	Nur Syafiqah Binti Yusup, ChM *M/7028/11298/25*
Amirah Farhan Binti Kamaruddin, ChM Dr. *M/6983/11229/25*	Mohanasunthari A/P Poornachandran, ChM *M/6969/11208/25*	Nur Syarina Binti Alwi, ChM *M/6977/11222/25*
Azren Izliani Binti Mohd Razali, ChM *M/7008/11266/25*	Mohd Badrulhaswan Bin Besar, ChM Dr. *M/7016/11279/25*	Nurina Adriana Binti Abdul Razak, ChM *M/7039/11316/25*
Bryan Lim Chi Wah, ChM *M/6992/11243/25*	Mohd Hariz Faiz Bin Mohd Fazli, ChM *M/6965/11201/25*	Nurul Ain Binti Mat Sani, ChM *M/7022/11286/25*
Byron Mc Michael Kadum, ChM *M/7013/11273/25*	Mohd Syafiq Bin Elias, ChM *M/7012/11272/25*	Nurul Atiqah Binti Azahari, ChM *M/6955/11185/25*
Chen Yin Peng, ChM *M/7018/11282/25*	Muhammad Abdurrahman Munir, ChM Dr. *M/6997/11248/25*	Nurul Faqihah Binti Mohd Shukri Shuhaimi, ChM *M/6951/11177/25*
Chooi Xue Wen, ChM *M/7019/11283/25*	Muhammad Adib Athir Bin Ahmad, ChM *M/7006/11263/25*	Nurul Izzati Binti Ramlee, ChM *M/6961/11194/25*
Clarence Sixtus Anak Harry Benter, ChM *M/6982/11228/25*	Muhammad Alif Bin Zailani, ChM *M/7014/11275/25*	Nurul Merza Fatehah Binti Marjan, ChM *M/7003/11258/25*
Dzilal Binti Amir, ChM *M/6976/11220/25*	Muhammad Faizol Bin Badruzaman, ChM *M/7031/11305/25*	Nurul Najihah Binti Mohd Putra, ChM *M/7024/11288/25*
Farah Izzati Binti Asrin, ChM *M/7021/11285/25*	Muhammad Faris Bin Abd Rashid, ChM *M/6975/11219/25*	Nurul Syahira Binti Samsu, ChM *M/7025/11289/25*
Farah Nabilah Binti Mohd Zaidi, ChM *M/6981/11227/25*	Muhammad Hafizuddin Bin Mokhtar, ChM *M/6986/11233/25*	Nurzam Ezdiani Binti Che Hussin @ Zakaria, ChM Dr. *M/6958/11189/25*
Fatin Farhana Binti Shamsuddin, ChM *M/7001/11254/25*	Nadiah Binti Mad Nasir, ChM Dr. *M/7030/11304/25*	Peter Cheong Chiew Hing, ChM Dr. *M/7037/11314/25*
Haryanty Binti Abd Karim, ChM *M/7036/11313/25*	Nadirah Binti Abd Hamid, ChM *M/7040/11317/25*	Prabakaran A/L Devaragin, ChM *M/6964/11199/25*
Joenah Anak Putit, ChM *M/6966/11202/25*	Najibah Binti Zakaria, ChM *M/6971/11212/25*	Puvana Devi A/P Selvarajoo, ChM *M/6967/11206/25*
Joienna Anak John Sabadurai, ChM *M/6960/11191/25*	Nashrin Iszhan Bin Ishak, ChM *M/6968/11207/25*	Raihana Binti Mohd Yusof, ChM *M/6973/11215/25*
Khairul Aidil Bin Samsudin, ChM *M/6978/11223/25*	Ninie Suhana Binti Abdul Manan, ChM Dr. *M/6974/11216/25*	Rashyini A/P Thanabalan, ChM *M/6953/11179/25*
Khalidah Binti Ab Latiff, ChM *M/7015/11277/25*	Noor Akhmar Bin Kamarudin, ChM *M/7020/11284/25*	Sam Suat Peng, ChM *M/6989/11238/25*
Kong Chin Khee, ChM *M/6970/11210/25*	Noor Azliana Ab Rahman, ChM *M/6993/11244/25*	Sasi Devi A/P Joseph, ChM *M/6952/11178/25*
Kuhan Chandru A/L Balasanthiran, ChM Dr. *M/6995/11246/25*	Noor Hafizah Binti Mohamad, ChM *M/7042/11320/25*	Sharifuddin Bin Md Zain, Prof. ChM Dr. *M/6972/11213/25*
Law Kai En, ChM Dr. *M/7027/11292/25*	Noorazlina Binti Adnan, ChM *M/6980/11225/25*	Siew Wei Yuan, ChM *M/6988/11237/25*
Lee Jia Yen, ChM *M/7038/11315/25*	Nor Alia Syafika Binti Zulkipli, ChM *M/6956/11187/25*	Siti Noriah Binti Mohd Shotor, ChM *M/6991/11242/25*
Logeswary A/P R.M. Fiter, ChM Dr. M/6985/11231/25	Nor Shafiq Bin Mohd Jamel, ChM Dr. *M/7009/11269/25*	Siti Nursyamsulbahria Binti Che Nan, ChM *M/7005/11261/25*
	Norahim Bin Ibrahim, ChM Dr. *M/6996/11247/25*	Siti Raihana Binti Ramli, ChM *M/6959/11190/25*

Siti Rosnah Binti Mustapa, ChM *M/6987/11234/25*	Nur Alia Adnin Binti Zainol Abidin, ChM *L/3838/11211/25*	Marcella Marlene Meddy, ChM *M/7052/7368/16/25*
Siti Shurazizah Binti Sukhur, ChM *M/7023/11287/25*	Nur Anisha Binti Ahamady, ChM *L/3863/11303/25*	Mohd Azmil bin Mohd Noor, ChM Dr. *M/7061/5927/11/25*
Siti Solehah Binti Ahmad Norrahma, ChM Dr. *M/7045/11324/25*	Nur Hanis Syazana Binti Harun, ChM *L/3853/11274/25*	Muhammad Ashraf bin Mohd Kahar, ChM *M/7048/9012/21/25*
Tee Li Ze, ChM *M/7004/11259/25*	Nur Hanisah Binti Asri, ChM *L/3830/11182/25*	Muhammad Fauzi bin Ahmad, ChM *M/7058/6833/14/25*
Thivya A/P Selvam, ChM *M/7011/11271/25*	Nurizattie Akma Binti Suhaini, ChM *L/3856/11290/25*	Ng Aik Tong, ChM *M/7053/1331/80/25*
Yam Wan Sinn, ChM Dr. *M/7034/11310/25*	Nursyarafana Binti Rosni, ChM *L/3834/11193/25*	Ng Wei Ting, ChM *M/7051/10002/23/25*
Yap Yi Ying, ChM *M/7002/11256/25*	Nurul Shahida Binti Ameran, ChM *L/3840/11217/25*	Rohana Bte Anis, ChM *M/7056/4116/01/25*
Yasmin Syahirah Binti Noor Azman, ChM *M/7033/11307/25*	Nurul Suhada Binti Rosasman, ChM *L/3864/11308/25*	Sathyaraj A/l Manmmadurai, ChM *M/7062/8009/18/25*
Yeap Dan Kwei, ChM *M/6962/11195/25*	Qhairun Niesyak Binti Abd Rahman, ChM *L/3829/11180/25*	Shahrul Azwan bin Abdul Khalil, ChM *M/7050/8220/18/25*
Zuraidah Binti Mohd Rais, ChM *M/7010/11270/25*	Siti Aisyah Humaira Binti Ghazali, ChM *L/3845/11236/25*	Sherona Anne Simon, ChM *M/7054/7369/16/25*
	Siti Sarah Binti Abdul Rahaman, ChM *L/3861/11300/25*	Siti Zahirah binti Dris, ChM *M/7057/8678/20/25*
New Members (LMIC)	Siti Zaleha Binti Zamada, ChM *L/3836/11198/25*	Tew Zi Wei, ChM *M/7047/10219/23/25*
Alyaa Syahirah Binti A Murad, ChM *L/3851/11262/25*	Sumaliny A/P Subramaniam, ChM *L/3831/11183/25*	
Amy Azrina Nazira Binti Madjais, ChM *L/3858/11294/25*	Sunita Anak Piking, ChM *L/3857/11293/25*	
Arathi A/P A Siaramu, ChM *L/3865/11309/25*	Suwaibah Binti Rozali, ChM *L/3850/11260/25*	
Azmira Fitri Iliana Binti Azis, ChM *L/3841/11221/25*	Tan Jingru, ChM *L/3866/11325/25*	
Chia Xin Yue, ChM *L/3837/11204/25*	Thivya A/P Keasavan, ChM *L/3843/11232/25*	
Kayalvili A/P Ramachandran, ChM *L/3833/11192/25*	Tiong Ke Yi, ChM *L/3835/11196/25*	
Lee Ai Xin, ChM *L/3828/10960/25*	Vaisnavi Naidu A/P Muniandy, ChM *L/3847/11240/25*	
Mazidah Binti Md Nor, ChM *L/3855/11280/25*	Valerie Jara Anak Seman, ChM *L/3848/11250/25*	
Miza Syazwani Binti Mustaming, ChM *L/3859/11296/25*	Wan Noorfazliana Umirah Binti Wan Yusoff, ChM *L/3852/11267/25*	
Muhammad Heiqal Bin Jemain, ChM *L/3860/11299/25*	Wan Nurul Husna Binti Wan Sabeng, ChM *L/3832/11184/25*	
Muhammad Izhar Bin Mohd Kamal, ChM *L/3846/11239/25*		
Muhammad Naqib Hakim Bin Mohd Pouzi, ChM *L/3862/11301/25*	**Upgrading to MMIC**	
Muhammad Syukri Helmi Bin Mohd Suffian, ChM *L/3854/11278/25*	Beatrice Bangie Anak Desmond Sateng, ChM *M/7063/8871/20/25*	
Nik Mohamad Azren Bin Mohd Zubir, ChM *L/3849/11253/25*	Eustance Anak Juan, ChM *M/7059/10437/24/25*	
Nor Amin Bin Ahmad, ChM *L/3844/11235/25*	Irina Kesuma binti Ibrahim, ChM *M/7049/9821/23/25*	
Nor Asma Umais Binti Mohammad Saufi, ChM *L/3842/11226/25*	Khor Sook Mei, ChM Dr. *M/7055/4767/05/25*	
Nor Dalilah Haziqah Binti Rusnaizi, ChM *L/3839/11214/25*	Lam Kit Lay, ChM Dr. *M/7060/9136/21/25*	

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