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MATERIALS MIND

Issue 28

October 2020

www.iomm.org.my

Institute of Materials, Malaysia

HIGHLIGHTS

- Materials Lecture Competition
- FP & FPQC 1st virtual IMM training and assessment
- High temperature hydrogen attack– A silent killer
- Sampling precautions in relation to FTIR fingerprinting for paints
- Can other scientific analyses besides FTIR analysis be used to monitor the consistency of batch-to-batch protective paints?
- Good practice for generation of Reference FTIR spectrum for Coating Fingerprint Certificate

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EDITORIAL BOARD MEMBERS

INSTITUTE OF MATERIALS, MALAYSIA

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Electronic copy of Materials Mind can be accessed via www.iomm.org.my under Materials Mind Webpage

Message from the President

Assalamualaikum w.b.t and greetings to all. I would like to take this chance to wish all IMM members the best of health. Despite the many challenges it has brought us, I hope 2020 has been a great year to you.

With the current pandemic issue griping the world, we are pleased to see a silver lining in the form of adoption of the IR4.0 related technologies. The disruption of direct communication as well as the worldwide travel ban has pushed video conferencing, Internet-of-Things (IoT), cloud computing and other related technologies to become the new norm. And it does not only affect the how the industry players operate, but it also changes the way we provide education as well as changing the lives of the general public.

In accordance to these changes, IMM must change the way we do things. This includes opting for virtual conference and meeting, adopting new methodologies and technologies in our training modules, as well as bringing more technologically advanced companies and institution to ensure that we are all updated with the latest skills and knowledge necessary to cope with the current and future challenges.

With the lack of event this year due to the pandemic, I am pleased to announce that we will have a grand event in early next year, that will be participated by all IMM members from all working committees. There will be a technical conference, exhibition and career fair. In addition to those technical events, we also add golf tournament, hackathon and gala dinner so that it can be enjoyed by everyone. Aside form that, the event will be a great opportunity to push for our membership drive. This will ensure that our members will grow in numbers sustainably.

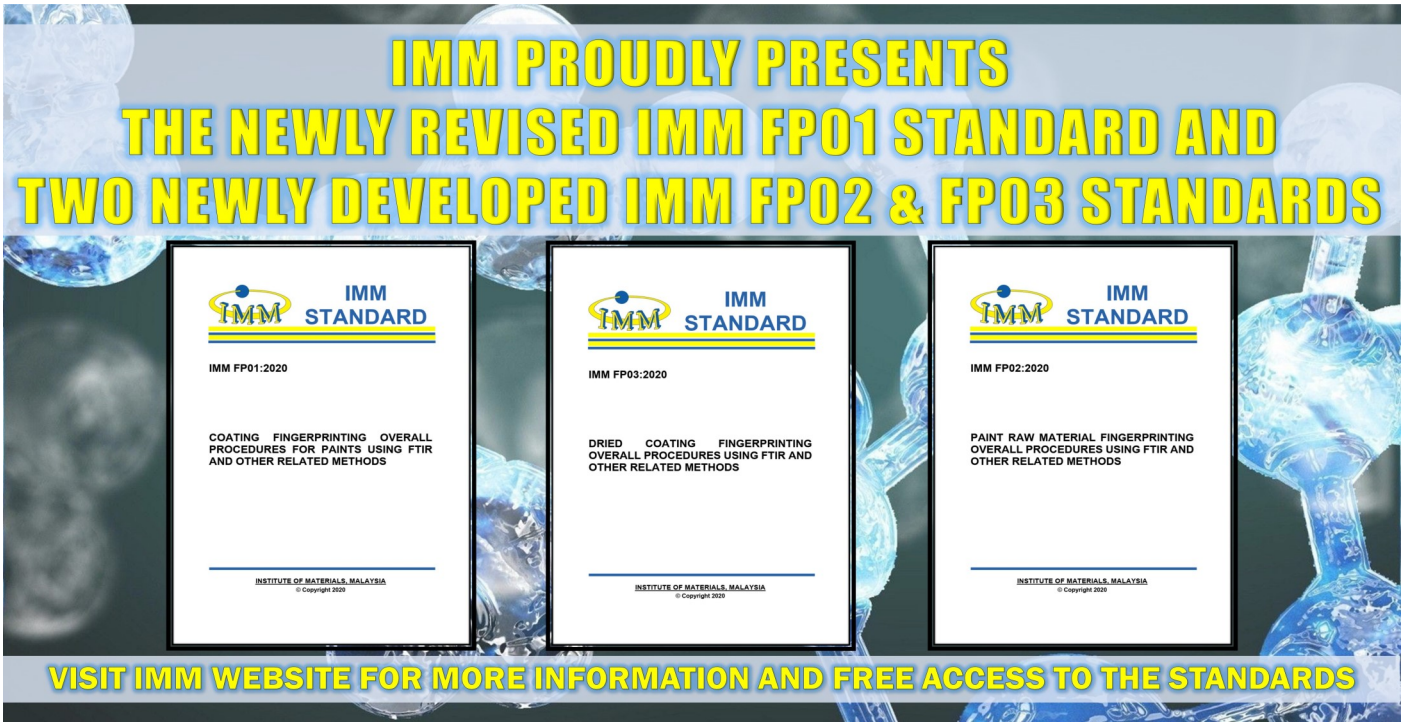
In any case, there will be many more events and activities lining up right after the grand event. Hopefully with the new norm, we can create more excitement not only to new members, but also to our loyal members who has been supporting IMM all these years.

Lastly, I would like to thank the council members, the working committees and all IMM members for your support. Let's work to the betterment of IMM and Malaysia as a whole.

Thank you.

Dato' Dr. Ir. Ts. Haji Mohd Abdul Karim Abdullah

October 2020



COVER STORY

MATERIALS LECTURE COMPETITION

Prepared by
PROF. DR. ESAH HAMZAH, *FIMM, C.Eng, C.MarEng.*
Adjunct Professor, Universiti Teknologi Malaysia
Chairperson, Materials Lecture Competition Committee

The Institute of Materials, Malaysia (IMM) introduced Materials Lecture Competition (MLC) in the year 2012 to give an opportunity to young students and researchers from the public and private universities in Malaysia, to deliver short lecture particularly in the area of materials science and engineering to a diversified audience. This was followed by MLC2013 in the following year and has become an annual event of IMM ever since. An MoU was signed between IMM and the Institute of Materials, Minerals and Mining (IOM3)-Malaysia Branch to allow MLC2013 first winner to participate in the Young Person's World Lecture Competition (YPWLC2013) in Hong Kong as a Malaysia Finalist. From then on, all first winners of MLC competitions became the Malaysia Finalists in YPWLC events organised by IOM3 United Kingdom. The annual YPWLC competitions were organised in various parts of the world such as Singapore, Florida-USA, South Africa, Kuala Lumpur-Malaysia, Sao Paulo-Brazil, Hong Kong, California-USA, Ireland, Perth-Australia as well as in London-UK.

Similar to YPWLC, MLC restricts the age limit for the competitors at 28 or under on the year of the competition. The competitors are required to deliver a 15 minutes lecture on any topics related to materials science and engineering and will be judged by 4 judges whom will ask general questions related to the topics presented by the competitors. The judges are nominated among the academia and industry practitioners who have vast experience in their respective professions. The judging criteria and penalties are similar to the international YPWLC competition that include the following;

1. Abstract of the presentation material– 10 marks
2. Structure of lecture – 25 marks
3. Standard of presentation – 25 marks
4. Visual aids and physical examples – 10 marks
5. Technical content – 15 marks
6. Handling questions – 15 marks
7. Penalties for the lecture time below or exceeding the allocated 15 mins to each competitor;
   Over 17/19 minutes: 5/10 marks deducted; Under 13/12 minutes: 5/10 marks deducted

The past MLC events had been a success with at least 10 competitors from different universities participated in the competition. Each competitor has to go through an internal MLC competition at his or her own university and the first winner will represent the university in the national MLC competition. Apart from MLC2012 and the latest MLC2020, all MLC national competitions were conducted in two parts: MLC semi-final and MLC final. The main objective of the MLC semi-final competition is to select the top five winners and these winners will compete in the MLC final normally about held a month after the semi-final event. The first winner of the final event will represent Malaysia as Malaysia finalist in the international YPWLC competition. The Malaysia finalist participation in the YPWLC competition abroad is fully sponsored by IOM3, UK that include the airfare, hotel accommodation, lunches & dinners, trips to industries and interesting local sights in the country where the competition is being held. The top three winners of the YPWLC will receive cash and other prizes.

As for the national MLC competition, IMM awards the following prizes to the top five winners;

First winner: RM 3,000 cash, a plaque and a certificate

Second winner: RM 2,000 cash, a plaque and a certificate

Third winner: RM 1,000 cash, a plaque and a certificate

Consolation prize 1: RM 500 cash and a certificate

Consolation prize 2: RM 500 cash and a certificate

One of the MLC event objectives is to promote IMM among the students and academics in the public and private universities. The annual MLC competition flyers will be on display on IMM and the universities websites to encourage participation and at the same time making IMM known to the new students. The MLC event is jointly organised by IMM, IOM3-UK and the host university. MLC committee with approval from IMM will nominate the host university and with the national MLC competition conducted in the campus, more students will have the opportunity to be involved in the event either as a competitor, organising committee or as an audience. A booklet containing the competitor's brief biodata and abstract of the presentation together with the detail programme is prepared for each MLC and the booklets are distributed to judges and audience. A summary of the past MLC events is as follows:

Year	Host and Co-organiser	MLC First Winner and Malaysia Finalist in YPWLC	YPWLC organised by IOM3, UK
2012 MLC2012	IMM	Undergraduate: Mr. Mohd Danial Shafiq Universiti Sains Malaysia (USM) Postgraduate: Mr. M. Ghaddafy Affendy Universiti Sains Malaysia (USM)	No participation from MLC2012 first winner.
2013 MLC2013	IMM	Ms. Farahani Irna Nazari Universiti Teknikal Malaysia Melaka (UTeM)	YPWLC2013 in Hong Kong
2014 MLC2014	Semi-Final: Universiti Teknologi MARA (UiTM) Final: IMM	Ms. Losini A/P Amarasan Multimedia University (MMU)	YPWLC2014 in Riverside, USA. Losini won 3rd place.
2015 MLC2015	Universiti Kebangsaan Malaysia (UKM)	Ms. Hana Atiqah Abdul Karim Universiti Malaya (UM)	YPWLC2015 in Dublin Ireland.
2016 MLC2016	Universiti Malaya (UM)	Mr. Hoy Chun Wai (APU)	YPWLC2016 in Araxa, Brazil
2017 MLC2017	Asia Pacific University of Technology and Innovation (APU)	Mr. Ng Zheng Yu Nottingham University Malaysia	YPWLC2017 in Perth, Australia. Zheng Yu won 3rd place.
2018 MLC2018	Universiti Teknologi Malaysia (UTM)	Mr. Andrew Ng Kay Lup Universiti Malaya (UM)	YPWLC2018 in Port Elizabeth, South Africa. Andrew won 3rd place.
2019 MLC2019	Universiti Teknikal Malaysia Melaka (UTeM)	Mr. Lam Jia Yong Universiti Putra Malaysia (UPM)	YPWLC2019 in London, UK. Jia Yong won 2nd place.
2020 MLC2020	Universiti Putra Malaysia (UPM) (Virtual competition)	Ms. Tan Kai Xin Universiti Malaysia Perlis (UNIMAP)	YPWLC2020 will be held online on 12th Nov 2020

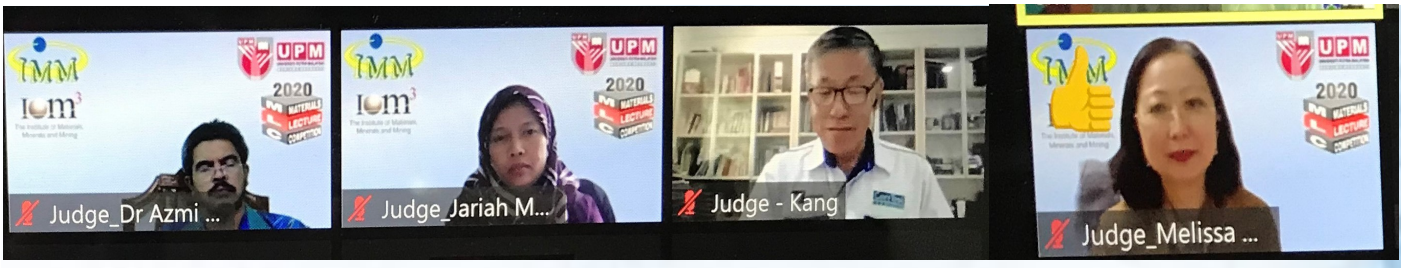


***Figure 1**: Virtual MLC2020 Panel of Judges*

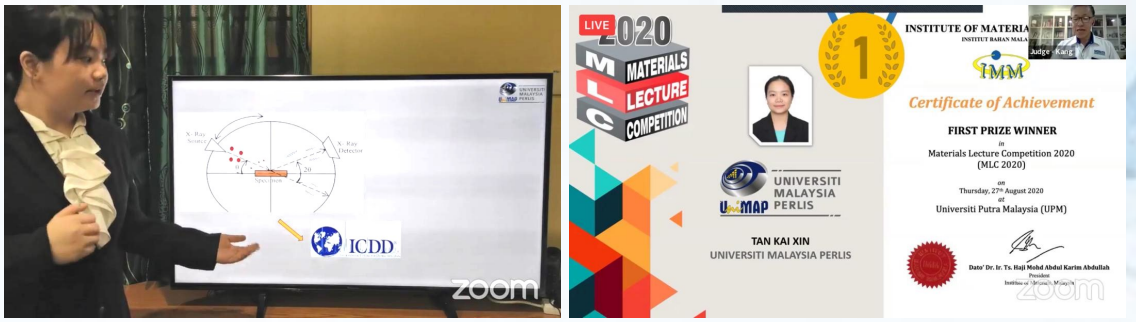


***Figure 2**: Tan Kai Xin from UNIMAP, First Winner of MLC2020 and Malaysia Finalist in YPWLC2020*

This year's MLC (MLC2020) was the first virtual competition held online via Zoom platform organised by Universiti Putra Malaysia (UPM) due to worldwide corona virus pandemic (COVID-19) and the Malaysian government restriction on public gathering. The 15-mins pre-recorded video of the presentation of each MLC2020 competitor was shown online to the audience and a panel of judges on the day of the competition followed by live Q&A session between the competitor and the judges. The MLC2020 event could also be watched through live streaming via **Facebook** set up by UPM and were viewed by more than **15,000 viewers**.

The main organizing committee of MLC events from 2012-2020 is the MLC committee appointed by IMM that comprises the academic staff of various universities in Malaysia and chaired by Prof. Dr. Esah Hamzah from Universiti Teknologi Malaysia. The MLC event has also achieved its other main objective in creating a collaboration and networking between IMM and the academia in the universities. It also nurtures good networking among the academicians from various universities in Malaysia and between the academia and industry practitioners. MLC has succeeded in achieving its foremost objective in generating many young talents and future leaders who are able to communicate their complex and state-of-the-art research projects to an audience with and without in-depth knowledge in materials science and engineering.

***Figure 3**: Some of the MLC & YPWLC events photos held in Malaysia and other countries from 2012-2019*

NOTICE FOR RENEWAL OF ANNUAL MEMBERSHIP AND SUBSCRIPTION FEES 2021

APPLICATION FOR RENEWAL OF MEMBERSHIP						
PARTICULARS OF MEMBER (*update where necessary*)						
PERSONAL INFORMATION						
FULL NAME	:					
TITLE	:		NRIC/PASSPORT	:		
DATE OF BIRTH	:		AGE	:		
CORRESPONDENCE ADDRESS	:					
MOBILE PHONE NO.	:		HOUSE PHONE NO.	:		
EMAIL ADDRESS	:					
IMM MEMBERSHIP NO.	:					
CURRENT JOB INFORMATION						
NAME OF COMPANY	:					
DESIGNATION/POSITION	:					
ADDRESS OF COMPANY	:					
OFFICE PHONE NO.	:		OFFICE FAX NO.	:		

MEMBERSHIP SUBSCRIPTION AND PAYMENT						
GRADE (Thick the appropriate box)		SUBSCRIPTION PERIOD				
	Fellow (F.I.M.M)		1-year			
	Professional (M.I.M.M)		More than 1-year, please state	:		years
	Associate (A.M.I.M.M)		Amount paid	:		
	Company					
	Ordinary					

MEMBERSHIP ANNUAL SUBSCRIPTION FEES SCHEDULE

Description	Amount (RM)				
	Fellow (F.I.M.M.)	Professional (M.I.M.M.)	Associate (A.M.I.M.M.)	Company	Ordinary
Annual Subscription	150.00	100.00	80.00	200.00	40.00

PAYMENT

Payment can be made by cheque, telegraphic transfer, bank draft, cash deposit machine or via online/internet banking as follows:

Account Name	:	Institute of Materials, Malaysia
Account	:	8009055156
Bank	:	CIMB
Swift Code	:	CIBBMYKL

SUBMISSION OF DOCUMENTS

Send your completed form together with the proof of payment either via email to **secretariatoffice.imm@gmail.com** or WhatsApp to **018- 9113480** or send by courier/post to:

The Secretariat
Institute of Materials, Malaysia
Suite 515, Block A, Kelana Centre Point
No.3, Jalan SS3/17, Kelana Jaya
47301 Petaling Jaya, Selangor

The membership renewal online form can be accessed through IMM website at this link
https://www.iomm.org.my/membership-renewal/

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ICOMST HACKATHON

TITLE & PROBLEM STATEMENT

1 AI AND PHYSICS BASED CONDITION MONITORING SYSTEM FOR ROTATING EQUIPMENT

Machine condition monitoring and fault diagnosis as a part of system maintenance has gained a lot of interest due to the potential benefits to be learned from reduced maintenance budgets, enhanced productivity and improved machine availability. However, AI (big data analysis) based condition monitoring system can create false alarm. Therefore, the solution is to cross check the alarm using physics equation.

Propose a method of Artificial intelligence (AI) based condition monitoring system with the capability of cross checking with Physics equation.

2 ONLINE MATERIAL DAMAGE DETECTION USING NON-DESTRUCTIVE/INTRUSIVE TESTING

The NDT inspections to assess the damage to structure or parts of the system is crucial for the saving of the maintenance cost, improving the safety and reliability of the entire system. Monitoring of structures to identify types of damages such as cracks in the early stages that occur under loading is essential in practical applications as it can reduce the risk of failure in structures.

Develop an online material damage detection to identify and visualize damage based on several non-destructive testing (NDT) methods.

ICOMST HACKATHON

TITLE & PROBLEM STATEMENT

3 DRONE TECHNOLOGY FOR CORROSION INSPECTION ON INACCESSIBLE AREA

Nowadays there are both simple drones which can record video or take still images, and advanced drones, to which all types of data collecting equipment can be attached. An increasing number of companies today are using drone technology for visual inspection, as it is a cost-conscious and effective way to inspect at heights and inaccessible areas

Build an AI based algorithm to identify corrosion on piping and structure.

4 AUTOMATED CUI DETECTION ON PIPELINE

Corrosion Under Insulation (CUI) has been identified as one of the most significant inspection challenges as it affects asset integrity. This corrosion type stems from the synergistic impact of the presence of water in the space between the insulation and the metallic pipe surface. In terms of detection accuracy and precision, the industry faces significant issues in the inspection of insulated assets, not only of pipes, but also tanks and vessels.

Develop automated inspection technologies for detecting CUI covering both visual inspection and other non-destructive testing (NDT) techniques.

REGISTRATION
FORM

2 DAY SINGLE PASS (ENTITLES ENTRY FOR ONE HOLDER)		
VIRTUAL ONLY	PHYSICAL ONLY	HYBRID (PHYSICAL+VIRTUAL)
RM 200	RM 900	RM 1000

ACCESS TO ALL TECHNICAL SESSIONS, PRESENTATIONS AND EXHIBITION AREA — INCLUDES FOOD, BEVERAGES AND NETWORKING SESSION — ALL COLLATERAL MATERIALS FROM THE CONFERENCE

*FREE ADMISSION FOR STUDENTS (PROVIDE STUDENT ID)

FILL IN YOUR DETAILS BELOW:

NO	NAME	COMPANY	EMAIL	COUNTRY
1				
2				
3				
4				
5				

I AM INTERESTED IN:

- ◯ PHYSICAL ONLY
- ◯ VIRTUAL ONLY
- ◯ HYBRID
- ◯ STUDENT (PLEASE PROVIDE STUDENT ID CARD)

PAYMENT MUST BE MADE BY CHEQUE, TELEGRAPHIC TRANSFER & BANK DRAFT TO:

ACCOUNT NAME:	INSTITUTE OF MATERIALS, MALAYSIA
ACCOUNT NO:	8009055156
BANK NAME:	CIMB BANK BERHAD
BANK BRANCH:	SURIA KLCC, KUALA LUMPUR
COUNTRY:	MALAYSIA
SWIFT CODE:	CIBBMYKL

PAYMENT MUST BE MADE AT LEAST ONE WEEK BEFORE THE CONFERENCE.
CHEQUE OR BANK DRAFT CAN BE SENT TO THE ADDRESS STATED BELOW VIA POST OR MAIL.
KINDLY SUBMIT PROOF OF PAYMENT TO THE IMM SECRETARIAT
VIA EMAIL (SECRETARIAT@IOMM.ORG.MY)

FOR ANY ENQUIRIES, CONTACT US AT:

IMM SECRETARIAT
EMAIL : secretariat@iomm.org.my
TEL : +6018-9113480

SUITE 515, LEVEL 5, BLOCK B,
KELANA CENTER POINT,
NO.3 JALAN SS 7/19, KELANA JAYA,
47301, PETALING JAYA

IMM FIRST COUNCIL MEETING
Term: 2020—2022

Date: 10th March 2020
Venue: Meeting room, Level 4, Menara Serba Dinamik, Shah Alam

Virtual using ZOOM meeting platform & face-to-face meeting


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1-300-88-5008

ADVISOR AND HO

PROF. TS. DR. MOHAMAD KAMAL HARUN

Age: 60 years old
Organization: University Teknologi MARA
Position: Deputy Vice Chancellor (Academic and International)

Working experience(s):

- 3 years as Dep. Vice Chancellor (Academic & International) at UiTM
- 2 years as Director of the Higher Edu. Leadership Academy, MOHE
- 4 years in several senior management positions at UMK
- 8 years in several senior management positions at UiTM

Professional membership(s):

- Professional Technologist by MBOT
- Fellow member of the Academy of Sciences Malaysia
- Fellow member of Malaysian Solid State Science & Technology Society
- Fellow member of International Institute of Plantation Malaysia
- Board member of Malaysia Logistics Innovation Berhad

Contribution to IMM:

Immediate Past President (2016 – 2020); President (2012 – 2016); Deputy President (2008 – 2012); 8 years as Council Member (2000 – 2008); Fellow member (F-00117)

IR. MAX ONG CHO

Age: 66 years old
Organization: Norimax Sdn. Bhd./ Sdn. Bhd.
Position: Executive Director/ Direc

Working Experience(s):

- 11 Years as Executive Director
- 6 Years as Director at JOTAC A

Professional Membership(s):

- Profe Practic
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- Chart IOM3– of UK
- NACE
- APEC Interna Engine
- Fellow
- Mem Metals, USA

Contribution to IMM:

27 Years as Honorary Secretary (Member (F-00088)

NORARY FELLOW

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JOTAC Academy

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tered Environmentalist of
Environmental Society

E Corrosion Specialist
C Engineer &
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w Member of IEM
ber of the Minerals,
& Materials Society of

1987-2014); Fellow

IR. MOHD SURADI MOHD YASIN

Age: 69 years old
Organization: JOTAC Academy Sdn. Bhd.
Position: Director

Working experience(s):

- 6 years as Director at JOTAC Academy Sdn. Bhd.
- 12 years as Executive Director at MTE Sdn. Bhd.
- 4 years as Manager in Business Development Div. at OGP Sdn. Bhd.
- 9 years as Head, Engineering Technical Standardization at PETRONAS

Professional Membership(s):

- Corporate Member of IEM
- Registered Professional Engineer of BEM

Contribution to IMM:

22 years as Honorary Treasurer (1996 – 2016); Council Member (1987 Protem Committee); 12 years as Director of IMM Resources Sdn. Bhd. (2006 – 2018); Fellow member (F-00010)

INSTITUTE OF MATERIALS, MALAYSIA

Updated on 30th October 2020

Institute of Materials, Malaysia (IMM) is a non-profit professional society that promotes honourable practice, professional ethics and encourages education in materials science, technology and engineering. Engineers, academicians, technicians, skilled workers and professionals are amongst its members exceeding 6800.

Registered with the Registrar of Societies on 6th November 1987, the Malaysian Materials Science & Technology Society (MMS) changed its name to the Institute of Materials, Malaysia (IMM) on 16th June 1997. The objectives of IMM include the training and development of individuals and companies in Malaysia to attain professional recognition in various fields of materials science, technology and engineering.

IMM is administered by a council of 30 members, with volunteers leading more than 15 materials committees and more than 4 regional chapters, and supported by a secretariat with full time staff.

IMM Vision

To be internationally recognised leading institution in Materials Science and Technology.

IMM Mission

(1) To be the technical authority on material science and technology
(2) To develop an enhance competency and skills for all categories and practitioner
(3) To become an internationally recognized certifying body
(4) To be the forum for industry and academia collaboration
(5) To positively contribute to society and quality of life

The IMM membership is categorised into 6 different grades and open to anyone above the age of 17 years - individuals and companies keen in developing and contributing towards the growth of materials science, technology and engineering in Malaysia.

Over the years, IMM have conducted courses on coatings, coatings fingerprinting, corrosion, welding, vibration etc in support of the oil and gas industry in Malaysia. Over 750 Coatings Inspectors have been trained and certified as well as more than 3300 Blasters & Painters, Supervisors, Corrosion Technician and Vibration Practitioners. Its certification programmes are recognized by PETRONAS and all oil & gas operators. Since January 2011, more than 80 Associate Welding Engineers, more than 90 Welding Engineers, more than 30 Senior Welding Engineers and more than 45 Coating Fingerprint Quality Controllers were trained and certified.

IMM has also organised 10 International Materials Technology conferences (IMTCE) on a biennial basis, and numerous technical seminars, educational programmes, technical visits, and materials awareness programmes since 1988.

Public courses, such as Microbiologically Influenced Corrosion (MIC) and Welding Technology for Non-Welding Personnel, are being offered occasionally. Training on materials awareness has also been conducted in public listed companies.

The courses and programmes are being organised by Authorized Training Body/Bodies and Authorized Event Organizer/Organizers.

Collaborations with the Asian Welding Federation, The Society for Protective Coatings, US (SSPC), Sabah Skills Technology Centre (SSTC), and local universities continue to be part of IMM's vision and long term mission to educate, train and serve the materials fraternity.

GENERAL INFORMATION ON MEMBERSHIP

The IMM Membership is open to all individuals and companies in developing the contribution of Materials science, technology and engineering towards industrial growth in Malaysia. The technology of materials is advancing day-to-day throughout the world. Membership to the IMM will enable networking and exchange of knowledge from a very wide variety of specialised areas of expertise. Please feel free to download or print a copy of the application form together with the IMM regulations. If you have any doubt, please do not hesitate to contact our secretariat through the phone; +603-76611591 or email to secretariat@iomm.org.my

Annual subscriptions shall be payable in advance on 1st January of each year. Those admitted into the IMM between 1st July and 31st December in any year shall pay only half the annual subscription. Seniors (above 55 years old) get 50% discount off their annual subscriptions.

We have an online application for membership for selected grades. Membership application forms in document format can be accessed from www.iomm.org.my.

Kindly fill the form and email to secretariat@iomm.org.my or send it to :

IMM SECRETARIAT
Suite 515, Level 5, Block A, Kelana Centre Point (Lobby B),
No. 3 Jalan SS 7/19, Kelana Jaya,
47301 Petaling Jaya, Selangor

IMM MEMBERSHIP BENEFITS

(1) IMM activities offer members to interact and network with representative from the industry, academia and government related to the Materials profession.

(2) Members will gain knowledge on career opportunities for their children, friends etc as IMM offers certification courses in skilled trades *e.g.* Welding, Painting, Inspection, Corrosion *etc.*

(3) IMM-JWES Welding Engineer Certification program leading to a Welding Engineer Certification which offers great employment opportunities in the oil & gas, heavy industry, marine and energy sectors.

(4) IMM publications – quarterly magazine plus annual conferences offer presenters an opportunity for their technical research or industry-academia papers to be published in ISI- and Scopus-index journals.

(5) IMM organizes many free technical events for members to acquire new knowledge and networking opportunities. Participants to these events will also receive Certificate of Attendance for their Continuing Professional Development records.

IMM MEMBERSHIP FEES SCHEDULE AS PER BELOW:

Description	Amount			
	Entrance Fee	Processing Fee	Transfer Fee	Annual Subscription
Fellow (F.I.M.M)	-	RM 300.00	RM 10.00	RM 150.00
Professional (M.I.M.M)	-	RM 150.00	RM 10.00	RM 100.00
Associate (A.M.I.M.M)	-	RM 150.00	RM 10.00	RM 80.00
Company	RM 50.00	-	-	RM 200.00
Ordinary	RM 20.00	-	-	RM 40.00
Student	RM 10.00	-	-	RM 10.00
Ordinary/ Company for affiliates	RM 40.00/ RM 50.00	-	-	NIL

INSTITUTE OF MATERIALS, MALAYSIA

Updated on 30th October 2020

REGULATIONS GOVERNING ADMISSION AND TRANSFER OF MEMBER GRADES

The Council shall establish a Membership Committee which will be responsible for these Regulations and for review of applications for new membership and transfer to other grades (upgrades). The Membership Committee shall recommend for Council approval for admission and transfer of membership. All grades of memberships are awarded at the discretion of the Council and may be withheld or withdrawn in the event of conduct likely to prejudice the standing of the Institute. Every member shall receive a membership certificate.

Every application for membership, individual or company, shall be proposed and seconded according to these regulations and shall be forwarded to the IMM Secretariat who on behalf of the Honorary Secretary will process for consideration and approval of the Membership Committee before tabling for Council's endorsement. The Council may at its discretion reject any application without assigning any reason thereof. The Council may use its discretion to exempt the need for proposer and seconder for Student, Ordinary and Company membership.

Each company on admission as a member shall be entitled to nominate one representative to exercise all rights of membership. Only representatives of Company membership, as well as Fellows (F.I.M.M.). Professional Members (M.I.M.M.) and Ordinary members shall have the right to vote and to hold office in IMM.

Only Malaysian Citizens can become Ordinary Members, Associate Members (A.M.I.M.M.), Professional Members (M.I.M.M.) and Fellow Members (F.I.M.M.) with voting rights. Foreigners can have membership to similar grades but shall have no voting rights.

MEMBERSHIP GRADE & REQUIREMENT

Honorary Fellow (Hon. F.I.M.M.)
The Council shall have the power to elect Honorary Fellows who shall be persons of eminence in science or industry. The election shall be based on a majority vote within the Council. Honorary fellows shall enjoy such privileges as may from time to time be determined by the Council.

Fellow (F.I.M.M.)
A person at least 35 years of age with approved academic qualifications, training and 8 years relevant responsible experience who has made significant contributions to the science and practice of profession of Materials Science and Engineering or has given distinguished service to industry or education.

Professional Member (M.I.M.M.)
A person at least 25 years of age, with approved academic qualifications and training, having at least 3 years responsible experience in Materials Science and Engineering, or a person at least 40 years of age, with at least 15 years of experience with practical responsibility, as demonstrated by thesis/dissertation or report and interview.

Associate Member (A.M.I.M.M.)
A person at least 25 years of age, who possesses an interest in Materials Science and Engineering but have not acquired the necessary experience or obtained the qualification, governing entry to Member grade. An Associate Member, on obtaining the necessary qualifications, may apply for transfer to Member grade.

Company Member
Any company that is involved or has interest in Materials Science and Engineering will be qualified to join as a company member.

Ordinary Member
Any Malaysian Citizen and above the age of 18 years engaged in activities related to research, development and applications in Materials Science and Engineering shall qualify for Ordinary Membership. Only Ordinary Members who meet the necessary minimum requirements may apply for transfer to membership grades of Fellow, Member and Associate Member and may use the abbreviated titles upon transfer.

Student Member
A student member shall be a person not under 17 years of age who at the time of application satisfies the Council that he has received a good general education and is studying subjects related to Materials Science or Engineering. A student member shall transfer to the grade of Ordinary Member after graduation provided he or she is suitably qualified and as soon as he or she is earning a full-time salary. A Student shall not become member of the IMM without the prior approval of the Vice-Chancellor or Head of Department of the university or relevant authority concerned.




Coating Fingerprinting Forum

IAVAC 2019


KLSF 2019


MLC 2019

FREE Ordinary Membership for Affiliates:

The Institute of Materials, Malaysia will recognize members of various professional institutions and societies for membership at "Ordinary Grade" without any annual subscriptions. Such members shall submit to IMM proof of their current membership of the respective institutions together with their application.

Members of the following institutions and societies are eligible to apply for affiliate membership:

1. American Welding Society
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8. Institute of Corrosion UK
9. Institute of Materials Singapore
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The companies shall submit to IMM proof of their current membership at the respective trade associations together with their application.

NOTE: The above provisions for affiliate membership for individuals and companies was approved by the IMM Council in accordance with the powers vested in the Council as per Clause 6.1.3 of the IMM Constitution and was subsequently endorsed by members at its 21st Annual General Meeting held on 19th March 2011.

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Sampling precautions in relation to FTIR fingerprinting for paints

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Abstract

Have you ever wondered how does the sampling of paint samples influence the spectrum in FTIR analysis during the execution of *Coating Fingerprint Certificate*? In this study, two types of amines (part B of the 2-pack epoxy paint) in different sampling containers were exposed to atmospheric- and vacuum-drying followed by the mass measurement and FTIR analysis. The exposure of amine part B, *i.e.* Ancamide 2050, in the paint container to atmospheric drying has an effect on its mass (mass gain) and FTIR spectrum (shift in wavenumbers and intensity at selected fingerprint regions). For Jotamastic 87 sample however, insignificant mass variation was observed. The FTIR spectrum shows slight changes (increase in the intensity of specific fingerprint regions) after drying. Both results indicate that the amines could undergo changes when exposed to atmospheric weather for long period of time or if the container were opened and closed multiple times during sampling.

Introduction

When a paint sample is filled into a smaller metal container either from the paint drum at job site (for verification purposes) or from the mixing tank in the paint manufacturing plant (for referencing), it is stored for a certain period of time before the next analyses are conducted. During the course of FTIR analysis for *Coating Fingerprint Certificate*, this container may be opened and closed multiple times depending on the frequency of replicates and analysis. Since the paint is made of partly solvent(s) and active substances, the chance of these chemicals either to evaporate and escape from the metal container or to react with surrounding atmosphere is possible if the storage and sampling procedures are not done properly (*e.g.* metal container is left opened for long period of time during analysis or is not sealed properly).

In this study, we attempt to investigate the influence of drying process (assuming that the solvent evaporates over time under the condition of open/close containers or when the containers are improperly sealed) on the mass and FTIR spectrum of paint hardener. This study gives indication about further influence on the degree of similarity (*r*) between two FTIR spectra that will be noted for quality control of paints [1-3].

Experimental

Amine samples (Ancamide 2050 and Jotamastic 87, both are part B of 2-pack epoxy paints) stored in different 500 mL containers were kindly provided by two paint manufacturers. The samples were dried in a fume hood for 7 days followed by two-step drying in a convection oven (55 °C, 4 days) and vacuum oven (25 °C, 3 days). The wet and dried paints were analyzed using iS10 FTIR spectrophotometer (Madison, UK) from 4000-650 cm^{-1} by averaging 32 scans at resolution of 4 cm^{-1}. Mass change was determined using Mettler Toledo (AB-304-S) weighing balance with accuracy of ± 0.0001 grams.

Results and discussion

Table 1 and **Figure 1** show, respectively, the mass difference and FTIR spectra of Ancamide 2050 before and after drying. The absorbance of certain absorption spectra increases after drying, *e.g.* 3600-3000 cm^{-1} (O-H stretching and N-H stretching) and 800-500 cm^{-1}. For this particular sample, the mass was gained (**Table 1**). Since Ancamide 2050 contains primarily a mixture fatty acids, unsaturated polymers with dimers, triethylenetetramine, tetraethylene pentamine, bisphenol A-epichlorohydrin condensate (< 70%) and benzoyl peroxide (< 35%) [4], the mass gain as well as the obvious increase in the absorption bands at 3600-3000 cm^{-1} (-OH stretching) could originate from the hygroscopic nature of tetraethylene pentamine and/or triethylenetetramine.

In addition, the absorbance of wavenumbers at 1645 cm^{-1} (C=O stretching) and 1551 cm^{-1} (N-H bending) increases significantly after drying. These changes signify that the exposure of particular paint sample to atmospheric weather may cause changes in its chemical structure.

***Table 1** Mass difference of Ancamide 2050 before and after drying*

Sample name	Before drying (gram)	After drying (gram)
Ancamide 2050-Batch 1	161.0000 ± 0.0001	168.0000 ± 0.0001
Ancamide 2050-Batch 2	162.0000 ± 0.0003	168.0000 ± 0.0001

Another amine (Jotamastic 87, part B for 2-pack epoxy paint) was also tested. Although it does not undergo any significant mass loss or gain, some differences in the absorbance of FTIR spectra before and after drying could be observed (**Figure 2**). The absorbance of absorption spectra at 3600-3000 cm^{-1} and 750-500 cm^{-1} for Jotamastic 87 slightly differ after drying despite the mass being constant (**Table 2**).

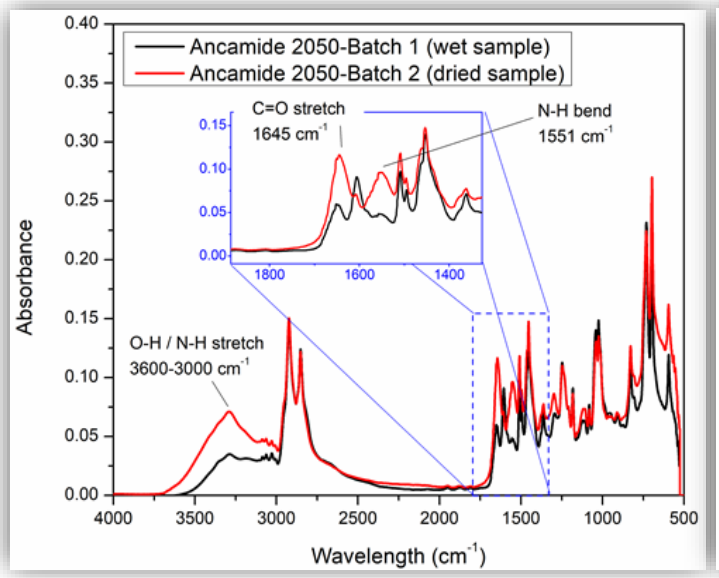

Figure 1 *FTIR spectra of Ancamide 2050-Batch 1 before and after drying.*

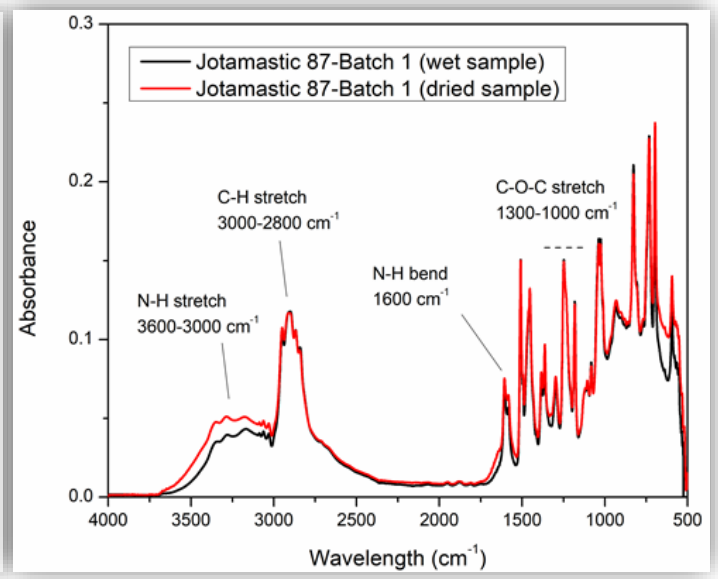

Figure 2 *FTIR spectra of Jotamastic 87-Batch 1 before and after drying.*

Table 2 *Mass difference of Jotamastic 87 before and after drying.*

Sample name	Before drying (gram)	After drying (gram)
Jotamastic 87-Batch 1	65.0000 ± 0.0001	64.0000 ± 0.0001
Jotamastic 87-Batch 2	88.0000 ± 0.0002	87.0000 ± 0.0001

Table 3 *r values of dried amines in reference to wet amines*

Sample name	*r* (4000-700 cm^{-1})	*r* (2000-900 cm^{-1})	Reference
Ancamide 2050-Batch 1_{dry}	0.593	0.476	Ancamide 2050-Batch 1_{wet}
Ancamide 2050-Batch 2_{dry}	0.609	0.479	
Jotamastic 87-Batch 1_{dry}	0.872	0.877	Jotamastic 87-Batch 1_{wet}
Jotamastic 87-Batch 2_{dry}	0.730	0.695	

Conclusion

It can be concluded that the amines (as hardener for epoxy) are slightly unstable due to the hygroscopic nature of this paint that easily absorbs moisture in the air and creates by-products. The extraction of paint sample, in particular of amines, from job site (during execution of *Coating Fingerprint Certificate*) to small containers, which has to be tightly sealed, for verification purposes shall be done as soon as the paint container is opened. If the paint container were opened and closed multiple times (*i.e.* project begins prior to the sample extraction) or stored (after the paint container is opened) for a long period of time with the sample container, which is not properly sealed, there could be changes in the FTIR spectra and/or mass. This in turn will affect the *r* values (degree of similarity obtained by comparing the sample spectra to a Reference spectrum) as shown in **Table 3** (the *r* values are below 0.900 ± 0.002, indicating low similarity between wet and dried paint).

Acknowledgement

The authors gratefully acknowledge the research funding from Serba Dinamik Holdings Bhd. [100-IRMI/PRI 16/6/2 (024/2018)] for the financial support of the research works.

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Note: all the publications related to the coating fingerprint can be viewed at https://www.iomm.org.my/related-publications-on-coating-fingerprinting/

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Can other scientific analyses besides FTIR analysis be used to monitor the consistency of batch-to-batch protective paints?

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For seven long years, the Institute of Materials, Malaysia (IMM) has been collaborating with various industries and educational institutions in addressing the issue of corrosion due to premature coating failure faced by especially the oil and gas industry. One of the identified factors is the batch-to-batch consistency of paint production and supply. The IMM task force has shown that the quality assurance/quality control (QA/QC) of protective paints can be monitored using Fourier transform infrared (FTIR) analysis [1]. This FTIR analysis provides rapid and reproducible measures in monitoring the batch-to-batch consistency of raw materials as well as paints [2].

Going backward in time when the task force assessed the use of different scientific instruments as the QC tools and decided to choose FTIR, there were not many details about other scientific instruments that can possibly serve as practical QC tools. In this article, we attempt to highlight some important features of instruments that may be useful for the QA/QC of batch-to-batch paint consistency if the analysts have more time and sufficient budget to explore further.

Thermal analyses

Thermogravimetry analysis (TGA) applies heat on a sample until it decomposes. The loss of mass is recorded as the function of temperature. Since paint is made up of many different chemicals (binders, pigments, solvents and additives), the QC of batch-to-batch paint consistency is possible by monitoring the mass loss as the paint materials are decomposed in TGA. **Figure 1** shows example thermograms of different grades amines (hardeners) from different paint manufacturers. As seen, the thermogram profile for individual amine is different. Although the batch-to-batch paint consistency can be differentiated visually *via* the mass loss comparison and thermal decomposition temperature, unfortunately, the commercial TGA software does not have similar mathematical function (*i.e. compare* algorithm to generate *degree of similarity*) found in the FTIR.

The use of differential scanning calorimeter (DSC) to monitor batch-to-batch paint consistency is also possible by investigating the difference between glass transition temperatures (for amorphous materials), crystallization and melting temperatures (for semicrystalline materials). This requires the analysts or quality controllers for **Coating Fingerprint Certificate** to understand the basics behind each thermal event. Similarly like TGA, DSC provides accurate information about thermal behavior of the paint components but does not dictate the similarity between the thermograms of different quality of different paints or different batches of the same paint.

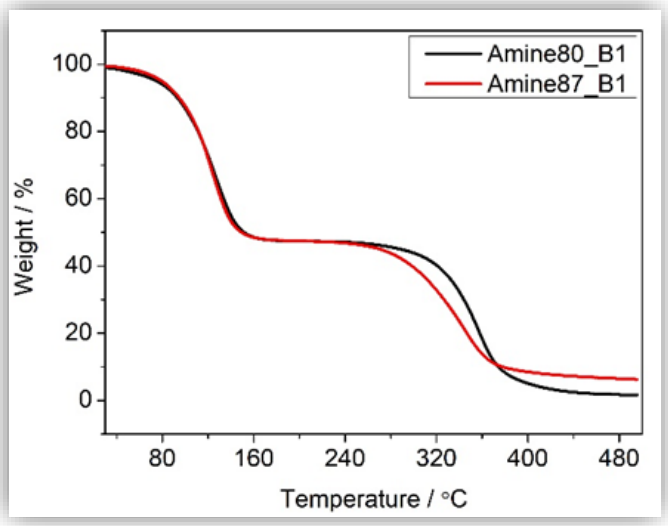

Figure 1 *TGA of different grades amines from different paint manufacturers.*

Raman spectroscopy

Unlike FTIR that measures the frequency (equivalent to wavenumbers) of molecular vibrations at which the sample absorbs radiation (a change in dipole moment), Raman spectroscopy measures the frequency of scattering when the sample receives radiation (a change in polarizability). FTIR and Raman have been successfully used in the detection of fake art paintings, counterfeit medicines and archaeological items. One of the main ingredients used in protective paint formulation is titanium dioxide. This pigment exists in different phases such as rutile, anatase and brookite. The tetragonal crystals of rutile and anatase are common in the paint formulation, but anatase is precluded for outdoor application due to the rapid degradation [3]. **Figure 2** shows the Raman and FTIR spectra of TiO_2 of different phases (rutile and anatase). The differences between these phases are minute in mid FTIR (4000-700 cm^{-1}), making the comparison challenging when a low content of TiO_2 (*i.e.* 3-5 wt%) is used in paints. Therefore, mid FTIR coupled with Raman gives clearer picture about the pigment content in paint formulation (*e.g.* identification of TiO_2 phases).

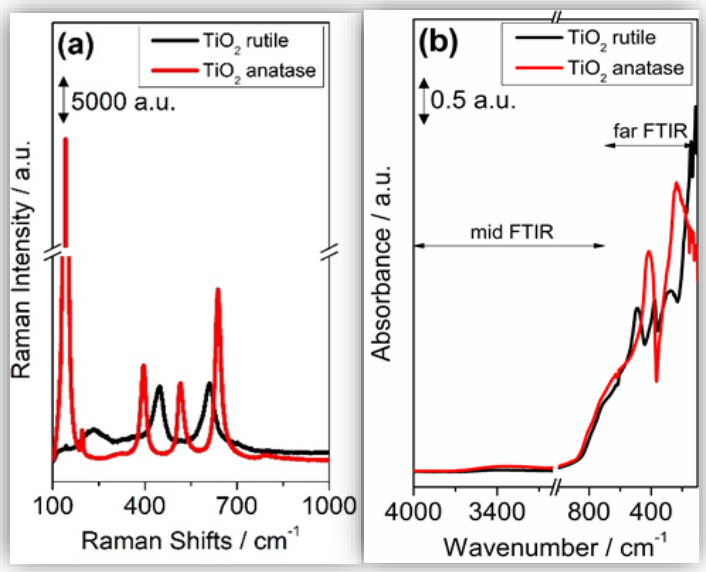

Figure 2 *(a) Raman and (b) FTIR spectra of TiO_2 rutile/anatase.*

Far-infrared

Far-infrared (400-10 cm^{-1}) has lower energy that permits detection of low frequency vibration (*i.e.* rotational movement) as compared to that of mid FTIR (4000-700 cm^{-1}). Similar to Raman, the combination of far-infrared with mid FTIR for monitoring paint consistency may be useful when there are inorganic components in the paint formulation that are insensitive or hard to be seen in mid FTIR.

Luminescence (fluorescence) spectroscopy

According to Sádecká and coworkers (2016), fluorescence data combined with chemometric tools can be useful to detect the adulteration of spirit drinks [4]. This study among so many implies that the method can also be used to monitor batch-to-batch paint consistency. On related paint analysis, the *X*-ray fluorescence has been reported to be useful for pigments analysis [5, 6], however, there has not been any method revealed for spectra comparison similarly to that described in IMM FP01:2020 for practical industry application [7].

Fiber optics reflectance spectroscopy

Fiber optics reflectance spectroscopy is useful for pigment identification. The spectra obtained from this analysis can be matched against the database of powdered mineral pigments [8] stored in the software. This technique is noninvasive and can be performed on dried powder pigments before paint formulation in less than one minute.

Mass spectroscopy

Mass spectrometer detects multiple ions that are released from the sample. Differentiation of paint using mass spectroscopy has also been reported on vehicle top coating [9], organic pigments [10]. It is usually coupled with TGA and/or gas chromatography in order to detect the chemical species that is present in the paint. This advanced technique requires a sound understanding on chemistry.

Concluding Remarks

There are many scientific analyses that can be used to monitor the paint quality either with batch-to-batch consistency of the incoming raw materials (pigments, binders and solvents) or batch-to-batch formulated paint in the mixing tank. They can go individually or can be coupled with other scientific tools. Each tool has its strength and weaknesses depending on the information to be extracted. For the easy of understanding, we lay out a comparison between these scientific tools in **Table 1** according to cost comparison, sample preparation requirement, analysis time and difficulty of operation. By comparison, the mid FTIR is still more practical and cost effective for QA/QC analysis, either in the testing laboratory as well as on-site verification for rapid results on batch-to-batch consistency of paint.

Table 1 *Comparison[1] (cost, sample preparation, analysis time, ease of operation) between different scientific analyses.*

	Cost[2]	Difficulty of sample prep.	Duration of analysis time	Difficulty of operation
FTIR	$	*	*	*
Raman	$$$	*	*	**
Far-FTIR	$$$	*	**	*
DSC	$$$$$	**	****	***
TGA	$$$$$	**	****	***
Luminescence	$$$	*	***	**
Optical	$$	***	**	**
Mass spectroscopy	$$$	***	***	*****

[1]Based on consultations with service providers and personal experiences

[2]entry-level instrument

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The authors gratefully acknowledge the research funding from Serba Dinamik Holdings Bhd. [100-IRMI/PRI 16/6/2 (024/2018)] for the financial support of the research works.

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Note: all the publications related to the coating fingerprint can be viewed at https://www.iomm.org.my/related-publications-on-coating-fingerprinting/

Good practice for generation of Reference FTIR spectrum for Coating Fingerprint Certificate

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Introduction

The batch-to-batch paint consistency stated in the Institute of Materials, Malaysia (IMM) standard FP01:2020 [1] uses a qualitative approach by assessing the degree of similarity (*r*) between two Fourier-transform infrared (FTIR) spectra of the sample paint and the Reference paint. During the qualification process, the end -user (oil and gas company) shall receive a Reference spectrum that has been cross-validated between the in-house laboratory (owned by paint manufacturer) and independent 3rd-party laboratory, where the acceptance threshold is $r \geq 0.90 \pm 0.01$ (degree of similarity with two significant figures for qualification test). For each paint system, the end-user shall keep one qualified Reference spectrum that is generated by the in-house laboratory. When the paint is delivered to the warehouse or project site, the coating inspector may validate the paint by comparing the sample spectrum with the qualified Reference spectrum using handheld or mobile FTIR, where the acceptance threshold is $r \geq 0.900 \pm 0.002$ (degree of similarity with three significant figures for batch-to-batch consistency check). Batch-to-batch paint reproducibility in the mixing tank was successfully demonstrated in previous studies by using paint raw materials [2], and their wet paints [3]. Reproducible result can be noted when Reference spectrum generated with good practice is used. This study is aimed to highlight the importance of having a good Reference spectrum and the consequences of bad Reference spectrum for qualification and routine/random batch check for in-house or on-site.

Experimental

The experimental procedure for sample collection and FTIR test method was mentioned in IMM FP01:2020 [1]. Four basic spectral processing rules for batch-to-batch paint consistency were discussed in Fingerprint Quality Controller Course Level 1 [4]. One of the rules is always closely examine the original spectrum by visual inspection before deciding on whether to process it or otherwise. This rule will be further explained using two case studies. **Case study I**: without background scanning for each sample. **Case study II**: without pre-screening of FTIR spectra before generation of Reference spectrum with statistical analysis.

Case Study I

Figure 1 shows the spectra difference of 2-pack epoxy zinc with and without background scanning for more than 1 hour, after the samples were changed for a few times. Without background scanning, the spectra show a mix of negative and positive absorption bands. Significant absorption bands corresponding to epoxy sample [epoxide (C-O-C) bands around 1236 cm^{-1} (part A) and amine (-NH) absorption bands around 1112 cm^{-1} (part B)] be hidden. Therefore, these spectra do not represent the fingerprint for that sample paint. This shows the importance of background scanning for each sample during spectra collection. It is essential due to the variety of paints produced by the paint manufacturer. Since each molecule uniquely owns specific vibrations, therefore different paint formulations exhibit different patterns of fingerprints.

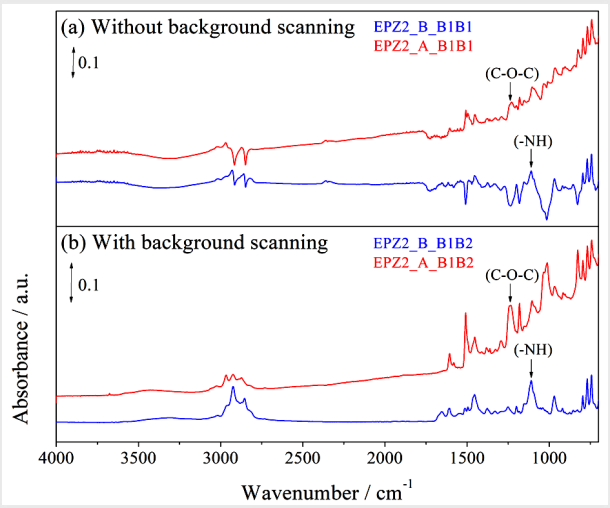

***Figure 1** Absorbance mode spectra of 2-pack epoxy zinc (EPZ) collected with and without background scanning after sample change.*

Case Study II

Once the nine spectra (which are comprised of three replicates from **T**op, **M**iddle and **B**ottom of the mixing tank) are collected, it must undergo pre-screening before it can be averaged as a Reference spectrum. If the generation of Reference spectrum is poorly done by simply averaging all the nine spectra without examining the spectra properly, it may implicate the paint qualification process. This step is necessary in order to avoid early sampling disputes. During pre-screening, the analyst may observe three possible cases of spectra overlay: (a) overlapped; (b) layered; and (c) outliers, as shown in **Figure 2**. With the generation of Reference spectrum that involves mathematical function (*i.e.* averaging nine spectra), these cases will affect *r* values. Through visual inspection from **Figure 2**, the overlay spectra in (a) and (b) show small difference between each spectrum, while obvious difference can be seen in (c). By estimation of degree of similarity, this small and obvious differences between the sample and Reference spectrum can be identified.

A simple statistical analysis may be conducted before averaging to the nine spectra. Averaging the overlapped nine spectra and layered nine spectra in **Figure 2** (a) and

(b) respectively is recommended when $r \geq 0.950$ for the spectra. Usually, the r values for overlapped spectra are close to one another (possess low standard deviation, around ± 0.010). However, averaging the spectra in **Figure 2** (c) is not recommended as the outlier spectra failed the acceptance criterion ($r < 0.950$). Therefore, any outlier spectra need to be removed and replaced with another spectra with $r \geq 0.950$, before generating Reference spectrum.

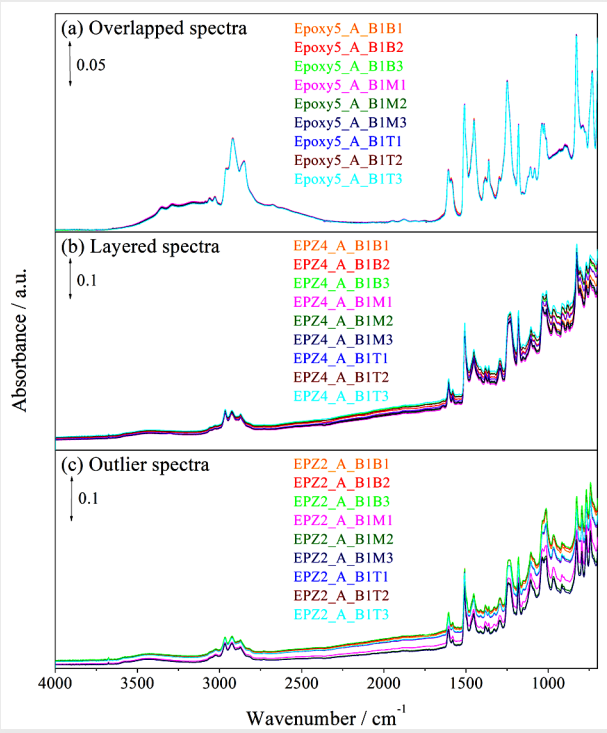

Figure 2 *Three cases during the pre-screening process for the generation of Reference spectrum*

Table 1 *Degree of similarity of batch-to-batch sample paint compares to the Reference spectrum (generated without pre-screening).*

Sample code	r (4000-700 cm^{-1})	r (2000-900 cm^{-1})	Reference spectrum (without pre-screening)
EPZ4_A_B2	0.880	0.894	EPZ4_A_Ref
EPZ4_B_B2	0.942	0.928	EPZ4_B_Ref
Epoxy4_A_B2	0.848	0.840	Epoxy4_A_Ref
Epoxy4_B_B2	0.949	0.931	Epoxy4_B_Ref
PU4_A_B2	0.795	0.908	PU4_A_Ref
PU4_B_B2	0.832	0.804	PU4_B_Ref

Table 2 *Degree of similarity of batch-to-batch sample paint compares to the Reference spectrum (generated with pre-screening).*

Sample code	r (4000-700 cm^{-1})	r (2000-900 cm^{-1})	Reference spectrum (with pre-screening)
EPZ4_A_B2	0.969	0.975	EPZ4_A_Ref
EPZ4_B_B2	0.994	0.995	EPZ4_B_Ref
Epoxy4_A_B2	0.989	0.990	Epoxy4_A_Ref
Epoxy4_B_B2	0.958	0.937	Epoxy4_B_Ref
PU4_A_B2	0.966	0.982	PU4_A_Ref
PU4_B_B2	0.997	0.997	PU4_B_Ref

Table 1 illustrates that a low degree of similarity ($r < 0.898$) can be obtained if a Reference spectrum is generated without pre-screening. On the contrary, if a well generated Reference spectrum (with pre-screening) is used, we may obtain high degree of similarity ($r \geq 0.898$), as shown in **Table 2**. The difference in the r values estimation for certain paint samples indicates that extra care is needed in practice. Otherwise, it may fail during paint consistency tests (*i.e.* qualification and routine/random batch check for in-house/on-site) and eventually leads to unnecessary rejection of the paint lot.

There are a few steps that the analyst needs to follow in order to minimize the error for the FTIR analysis of **Coating Fingerprint Certificate** (section 2: structural analyses) documentation. By attending Fingerprint Quality Controller Course Level 2 (refer **Figure 3**), the analyst will learn the good practices for generation of Reference spectrum for **Coating Fingerprint Certificate**. These precautions will be emphasized to reduce the possibility of unnecessary rejection of samples.

Figure 3 *Fingerprint Quality Controller Course Level 2*

Conclusion

The case studies highlight the importance of good practices for generation of Reference spectrum, which are **(1)** background scanning before FTIR analysis for each sample and **(2)** pre-screening of FTIR spectra before generation of Reference spectrum with statistical analysis.

Acknowledgement

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Note: all the publications related to the coating fingerprint can be viewed at https://www.iomm.org.my/related-publications-on-coating-fingerprinting/

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High temperature hydrogen attack - *A silent killer*

Introduction

Corrosion does happen in petroleum refinery and it may be one of the biggest problems that need to be taken care of to avoid losses. One of the corrosion types is due to the hydrogen attack or high temperature hydrogen attack (HTHA). HTHA is a type of damage that basically occurs in low-alloy and carbon steels pipes which is actually being exposed to high pressure gas at high temperature for long periods of time, thus, resulting the formation of cracks as well as loss in strength of the steel [1-2].

Carbon is the main strengthening constituent in steel whereby its removal will significantly decrease the strength of steel [3]. The steel that loses a number of carbon can be called as decarburized steel. The loss of strength in the steel is related to decarburization where the carbon content is reduced, hence contributing to the loss of strength of existing cracks and finally causing catastrophic failure. The absorbed atomic hydrogen will react with carbon or carbide to form methane gas in the carbon steel [4].

$C + 4H \rightarrow CH_4$ (gas) *or* $4H + MC \rightarrow CH_4 + M$

[M: Metal]

Methane gas is usually formed at the grain boundaries, inclusions, voids, dislocations and imperfect parts which are mostly present in welds [3]. The methane gas produced must not remain in the carbon steel pipe lest it will cause micro fissures and hence contribute to the crack formation on the steel pipe internally. Generally, a high stress concentration area is often being the initiation point for hydrogen attack [5], *e.g.* the welding area on carbon steel pipe where it is a high stress area and a heat affected zone (HAZ). This hydrogen attack can lead to sudden catastrophic brittle failure [6].

The Tesoro Failure Incident was an accident that might give a grim reminder on the effect of HTHA in refineries. The incident happened at Tesoro Refinery in Anacortes, Washington in 2010. It was a tragic accident that killed seven workers where the accident was contributed by HTHA in the heat exchanger. This incident gives a clear reminder that preventive measures are needed to parry this hydrogen attack.

Preventative Measure

The most common prevention method is by referring to Nelson Curves that act as the indicator of operating limits of steels for the oil and gas industry. All the curves on Nelson Curves have been developed from data resulting from long-term refinery experience [1]. According to the Nelson Curves, at any point above the Nelson Curves, carbon steel will be susceptible to HTHA while it is not the case below the Nelson Curves (*c.f.* Figure 1 and Figure 2).

Another prevention method is through material selection. Schweitzer (2010) [1] reported on selection of steels containing 1-2.25 wt% of chromium (Cr) and molybdenum (Mo) are recommended to be used in the hydrogen atmospheres at high temperatures because carbide-forming elements; Mo and Cr will increase the resistance of steel to hydrogen attack. However, the carbon content should be kept low as it will decrease the resistance of steel to hydrogen attack even though theoretically, higher number of carbon would make steel stronger. Austenitic stainless steel is one of the examples that would not be subjected to HTHA [1,3]. Other than that, elements such as chromium, molybdenum and vanadium that form a stable carbide will improve the resistance of steel towards HTHA [3].

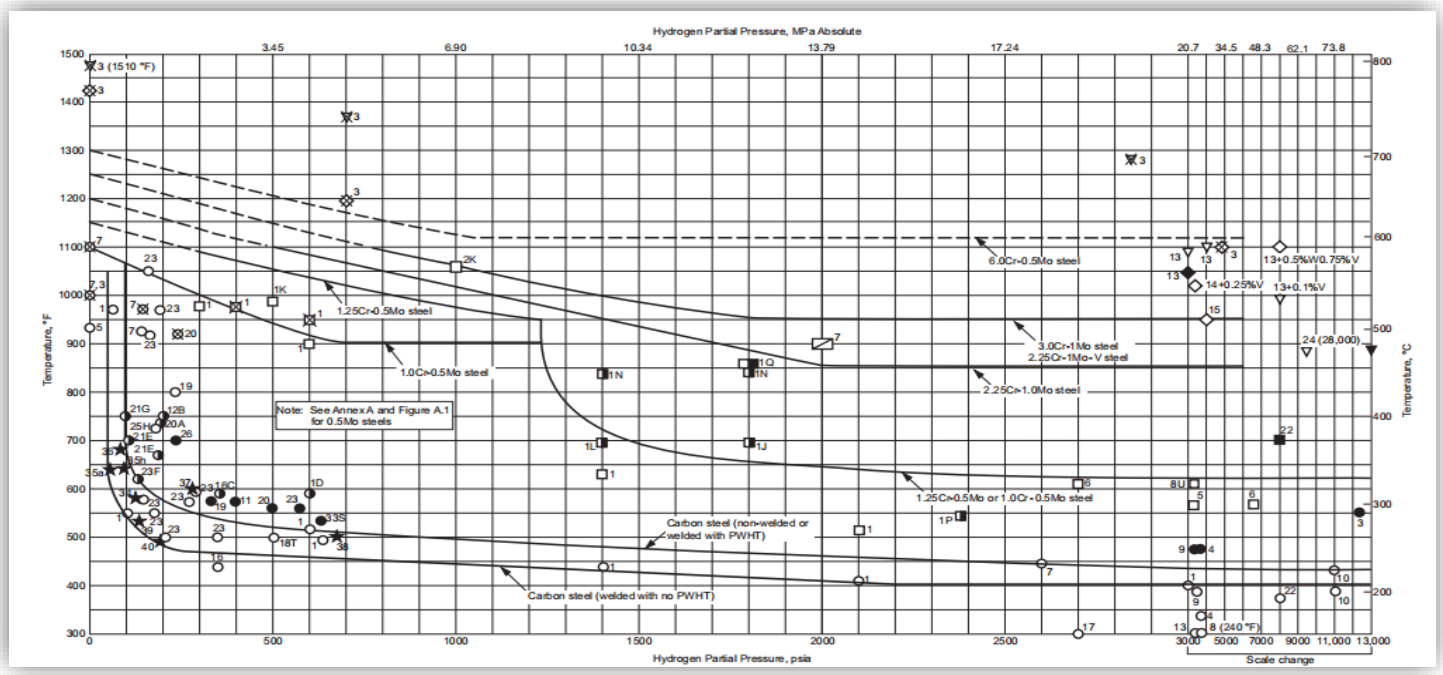

Figure 1: *Operating limits for steels in hydrogen services as to evade HTHA [7]*

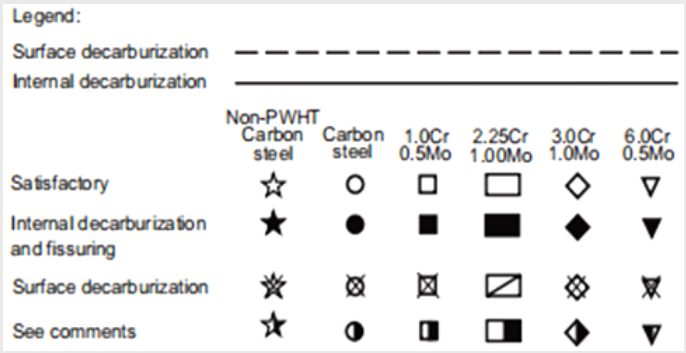

Figure 2: *Symbols on Nelson Curves [7]*

Benac and McAndrew (2012) [6] suggested to employ experienced workers who understand correctly on the phenomenon of HTHA as well as following the API 941 recommended practices. This would help to alleviate the HTHA problem in the refinery industry, thus can save life and cost.

Conclusion & Recommendation

More research on HTHA related to the preventative measure, inspections and damage curing should be done. For damage curing which is probably on treating crack formation, it will act as a temporary treatment before upgrading the material to a new one. It is very difficult to do inspections on the occurrence of HTHA since the damage can be microscopic and present in small localized areas of the equipment [3]. Besides, the inspection on HTHA has proved to be problematic and on-going inspection for HTHA can be a difficult task requiring significant expertise [2]. Hence, a review on the existing inspection method and development of a better inspection method on HTHA should be studied.

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IMM COATING FINGERPRINT CERTIFICATION SCHEME

What is Coating Fingerprint?

A quick & reliable Infra-Red (IR) technique to evaluate the products' **QUALITY & CONSISTENCY** by fingerprinting of materials in the product.

The paint & coatings and oil & gas industries have initiated the requirement for a polymeric Coating Fingerprint Certificate (similar to a Mill Certificate for metals) **to improve quality assurance and quality control.**

The authentication Fourier Transform Infra-Red (FTIR) analysis has been selected as the appropriate method to provide the requirement, in addition to other physical tests which are regularly conducted by the paint & coating manufacturers, for fingerprinting.

COATING FINGERPRINT FOUNDATION
Duration: 1 day

CERTIFIED COATING FINGERPRINT QUALITY CONTROLLER LEVEL 1
Duration: 2 days

CERTIFIED COATING FINGERPRINT QUALITY CONTROLLER LEVEL 2
Duration: 1 day

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WHY IMM COATING FINGERPRINT QUALITY CONTROLLER ?

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- The requirement of IMM FPQC Level 1 is now stated in Petronas Technical Standard (PTS) & Design and Engineering Practice (DEP).

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The First-of-its-kind Virtual Training Courses for "IMM Coating Fingerprint Certification

in collaboration with BRUKER


Reported by Suhaila Idayu Abdul Halim, Universiti Teknologi MARA, Secretary of Coating Fingerprinting Committee and Hairunnisa Ramli, Universiti Teknologi MARA, Member of Coating Fingerprinting Committee

Edited by Prof. Ts. ChM. Dr. Melissa Chan Chin Han, Universiti Teknologi MARA, Chairperson of Coating Fingerprinting Committee

Date: 22nd—24th July 2020
Venue: Zoom Online Platform

For the first time since 2015, the-first-of-its-kind virtual training courses of "IMM Coating Fingerprint Certification Scheme" were successfully undertaken from the comfort of one's own home or office. The transformation from conventional classroom style to a virtual learning platform with interactive and hands-on elements enabled the learning process to take place at anywhere and anytime. For the attendees who were not able to attend the online lecture and examination during office hours, a special arrangement was made for them after office hours. The training courses under "IMM Coating Fingerprint Certification Scheme" that were successfully held using Zoom platform were Coating Fingerprint Foundation Course (FPF) [22nd July 2020] and Certified Coating Fingerprint Quality Controller Level 1 (FPQC Level 1) [23rd – 24th July 2020]. Besides, the online assessment of two candidates for Certified Coating Fingerprint Trainer (FPT) was carried out on 22nd – 24th July 2020.

These virtual courses cover both theory and practical modules similar to the conventional courses, but with different modes of presentation. The live demonstration of the Fourier-transform infrared (FTIR) testing was replaced by pre-recorded video clips. Learning experience using a simulation program for comparing FTIR spectra of different isomers of xylene (common solvent for paint) was attempted during the online lectures. The feedback from the participants after the lectures were overwhelmingly positive, where participants were able to follow online lectures, experimental demonstration using video clips, learning using simulation programmes and hands-on using FTIR software remotely. The virtual **IMM Coating Fingerprint Certification Scheme** (training course and examination) is cost-effective for outstation participants at lower course fee and practically no travelling expenses.

***Figure 1**: Group photo of participants and trainer of Certified Coating Fingerprint Quality Controller Level 1*

In total, seven participants from paint manufacturer, contractor, 3rd-party testing laboratory, oil & gas user and universities from Malaysia and Singapore attended both 1-day FPF and 2-day FPQC Level 1 courses and subsequently sat for the online competency examination. The 1-day and 2-day training courses were given by Asst. Prof. Dr. Yu Lih Jiun (UCSI University, Deputy Chairperson of Coating Fingerprinting Committee) and Prof. Ts. ChM. Dr. Melissa Chan Chin Han (Universiti Teknologi MARA, Chairperson of Coating Fingerprinting Committee), respectively.

For more information on Coating Fingerprinting training and certification scheme, kindly go to IMM website, https://www.iomm.org.my/list-of-training-certification-programs/ or scan this QR code.

***Figure 2**: The "first-of-its-kind" virtual IMM Coating Fingerprint Foundation Course and FPQC Level 1*

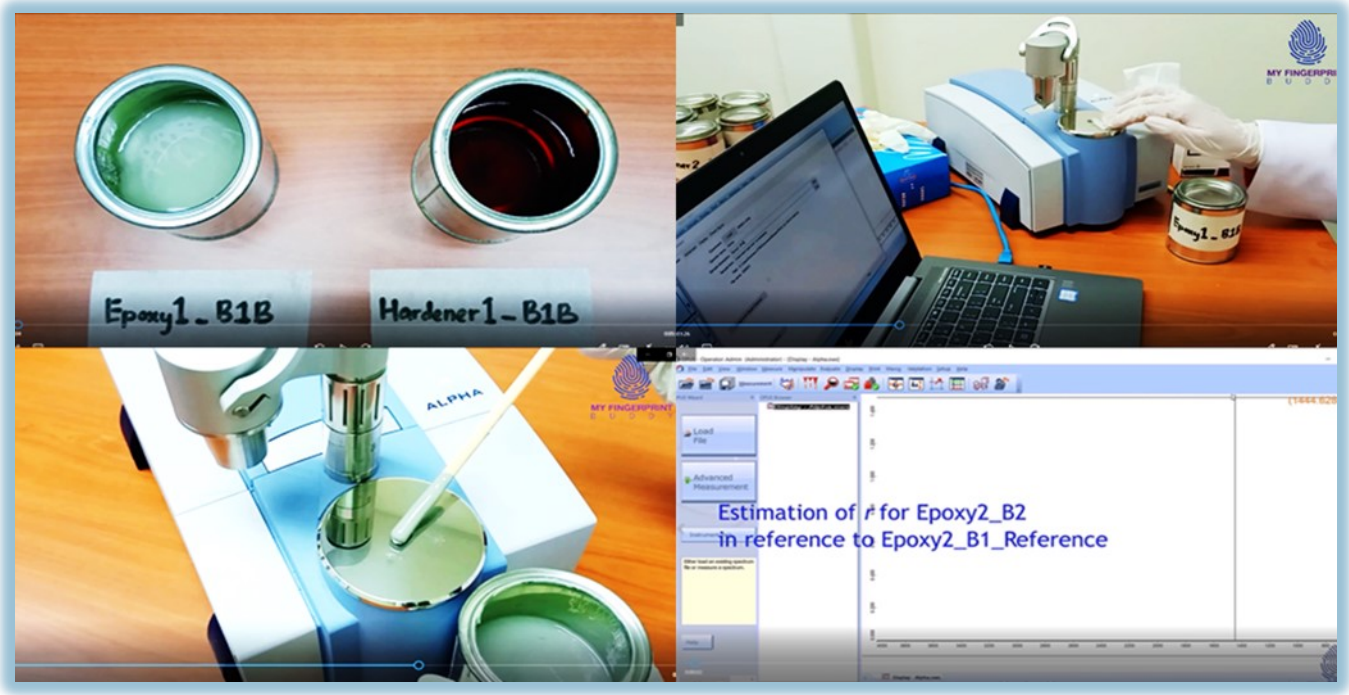


***Figure 3**: Video footage of virtual demonstration during the training courses*

Virtual Industrial Talk– INJECTION MOLDING– What You Need To Know?

in collaboration with


Reported by Ong Thai Kiat, Tunku Abdul Rahman Univeristy College, co-chairman of Polymer Committee and Dr. Chew Khoon Hee, chairman of Polymer Committee, Tunku Abdul Rahman Univeristy College.

Date: 29th July 2020
Venue: Google Meet Online Platform

An online industrial talk titled "INJECTION MOLDING - What You Need To Know" was jointly organized by the Faculty of Engineering and Technology (FOET), Tunku Abdul Rahman University College, Institute of Materials, Malaysia (IMM), Metalloy Consultant Services and students chapter of Institution of Mechanical Engineers. This event was successfully held on 29th July 2020 through an online platform - Google Meet. This online industrial talk had attracted 106 registered participants from universities as well as industries.

Speaker, Ts. William Lee, Founder & Technical Training Director of Metalloy Consultant Services, is a certified MBOT CPD program trainer. He shared his industrial experience in the field of plastic injection moulding.

The following topics were presented during the talk:

1. One Common Goal from Employers
2. Two Crucial Skills from Employees
3. Three Criteria from Mentors
4. Four Characteristics of Plastics
5. Five Conditions from Workshops

At the end of the talk, there was an interactive Q & A session where participants actively raised questions and Ts. Lee shared his views and experience. Based on feedback from the participants, the majority of them were satisfied with this event.

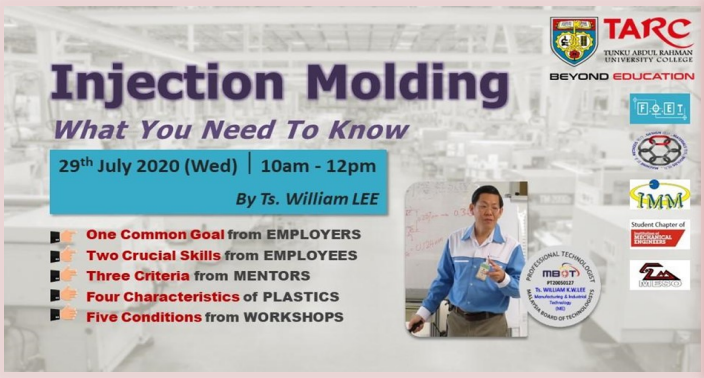


Figure 1: Event poster

Figure 2: A screen shoot during presentation of guest speaker.

Materials Lecture Competition 2020



Reported by Ts. Dr. Mohd Salahuddin Mohd Basri, Secretary, MLC 2020 Organising Committee, UPM; Assoc. Prof. Ts. Dr. Norkhairunnisa Mazlan, Organising Chairperson of MLC 2020, UPM
Edited by Prof. Dr. Esah Hamzah, Chairperson, Materials Lecture Competition Committee, Institute of Materials Malaysia (IMM)

Date: 27th August 2020
Venue: ZOOM platform centred in Infocomm Development Centre (iDEC), UPM

Materials Lecture Competition (MLC) is an annual event organized by the Institute of Materials Malaysia (IMM), Institute of Materials, Minerals and Mining (IOM3) UK and hosted by the selected universities in Malaysia. This much-awaited event by university students is aimed at providing a platform for young talents (below the age of 28 years old) to exhibit effective and impressive presentation skills in delivering topics in the field of material science and engineering. The first winner of the MLC will become the Malaysian Finalist and will represent Malaysia in the international event of Young Person's World Lecture Competition (YPWLC) organized by IOM3, United Kingdom.

This year's Materials Lecture Competition (MLC 2020) was held on the 27th August 2020 hosted and co-organized by Universiti Putra Malaysia (UPM), and the Chairperson was Assoc. Prof. Ts. Dr. Norkhairunnisa Mazlan. Due to the worldwide corona virus pandemic (COVID-19) and the Malaysian government restriction on public gathering, MLC2020 was conducted as a virtual competition and was successfully organized by UPM-MLC committee. This first virtual competition held via the ZOOM platform centred in Infocomm Development Centre (iDEC), UPM was sponsored by IMM, Dyna Forming Engineering & Technology Sdn. Bhd., Bumi Engineering & Consultancy Sdn. Bhd. and Budiman Inspection Sdn. Bhd. Each participant who represented the public and private universities in Malaysia was required to submit a 15-minute pre-recorded video of his/her presentation a few days before the competition. The video was then shown to the audience and a panel of judges on the day of the competition followed by a live Q & A session between the participant and the judges. The MLC 2020 event was streamed live via Facebook set up by UPM and viewed by more than 15,000 viewers.

***Figure 1**: UPM-MLC 2020 Organising Committee members in iDEC, UPM*

The virtual MLC 2020 received a staggering number of participation from both public and private universities in Malaysia, with thirteen students who were the first winners of MLC 2020 in their respective universities, competed in the MLC 2020 and the participants' list is as shown in Table 1. The virtual MLC 2020 event began with the welcoming remarks by Assoc. Prof. Ts. Dr. Norkhairunnisa Mazlan, the MLC 2020 Organising Chairperson. The event was officiated by the Vice Chancellor of Universiti Putra Malaysia (UPM), Prof. Dr. Mohd. Roslan Sulaiman. The panel of judges for the competition were Prof. Ts. Chm. Dr. Chan Chin Han (IMM Honorary Secretary/UiTM), Assoc. Prof. Dr. Jariah Mohamad Juoi (UTeM), Ir. Dr. Azmi Mohammed Nor (Principal Researcher at PETRONAS Research Sdn. Bhd.) and Mr. Kang Kim Ang (Corrtrol Synergy Sdn. Bhd.).

***Table 1:** Participants of the virtual MLC 2020 competition*

Participant	University
Nur Izzah Nabilah Haris	Universiti Putra Malaysia (UPM)
Farah Hawani Muhamad Taufi	International Islamic University Malaysia (IIUM)
Rabi'atul 'Adawiyah Zayadi	Universiti Tun Hussein Onn Malaysia (UTHM)
Mohamad Fakhrul Ridhwan Samsudin	Universiti Teknologi PETRONAS (UTP)
Nur Fatihah Tajul Arifin	Universiti Teknologi Malaysia (UTM)
Yong Hsin Nam Ernest	University of Nottingham Malaysia (UNM)
Ng Jia Sheng	Taylor's College
Cheeranan Krutsuwan A/P Nuphairode	Universiti Kebangsaan Malaysia (UKM)
Nur Anati Jamalluddin	Universiti Teknologi MARA (UiTM)
Nur Sofina Mohamad Johari	University of Malaya (UM)
Tan Kai Xin	Universiti Malaysia Perlis (UNIMAP)
Nurul Jannah Sallehuddin	Universiti Sains Malaysia (USM)
Nurul Syafiqah Hanapi	Universiti Malaysia Sarawak (UNIMAS)

From 3D nanofibers scaffold for tissue engineering to corrosion inhibitor tablet from oil palm empty fruit bunch, this year's virtual MLC 2020 competition showcased intriguing and excellent research. Miss Tan Kai Xin, a bachelor degree candidate in metallurgical engineering from UNIMAP, has been named as the first winner of the virtual MLC 2020 competition. Kai Xin's presentation entitled "A Step-Transition Mechanism of the Dehydrogenation Process of Titanium Hydride," wowed the judges and enabled her to represent Malaysia in the Young Persons' World Lecture Competition 2020 (YPWLC 2020) which will be a virtual competition organized by IOM3, UK in November 2020. Masters degree student, Miss Nur Sofina Mohamad Johari from Universiti Malaya (UM), and PhD student Mr. Mohamad Fakhrul Ridhwan Samsudin from Universiti Teknologi Petronas (UTP) were named the virtual MLC2020 second and third winners, respectively.

The first, second and third winners walked away with cash prizes of RM 3000, RM 2000 and RM 1000 respectively, together with plaques and certificates announced by the virtual MLC 2020 moderator of a panel of judges, Mr. Kang Kim Ang. Consolation cash prizes of RM 500 and certificates were also given to the fourth and fifth winners, Miss Nur Fatihah Tajul Arifin from Universiti Teknologi Malaysia (UTM) and Mr. Yong Hsin Nam Ernest from University of Nottingham Malaysia (UNM). The one day competition ended with closing remarks by the President of IMM, Dato' Dr. Ir. Ts. Mohd Abdul Karim Abdullah and announcement of the MLC 2021 new host which is Universiti Sains Malaysia (USM).

Figure 2: *Virtual MLC 2020 Panel of Judges*

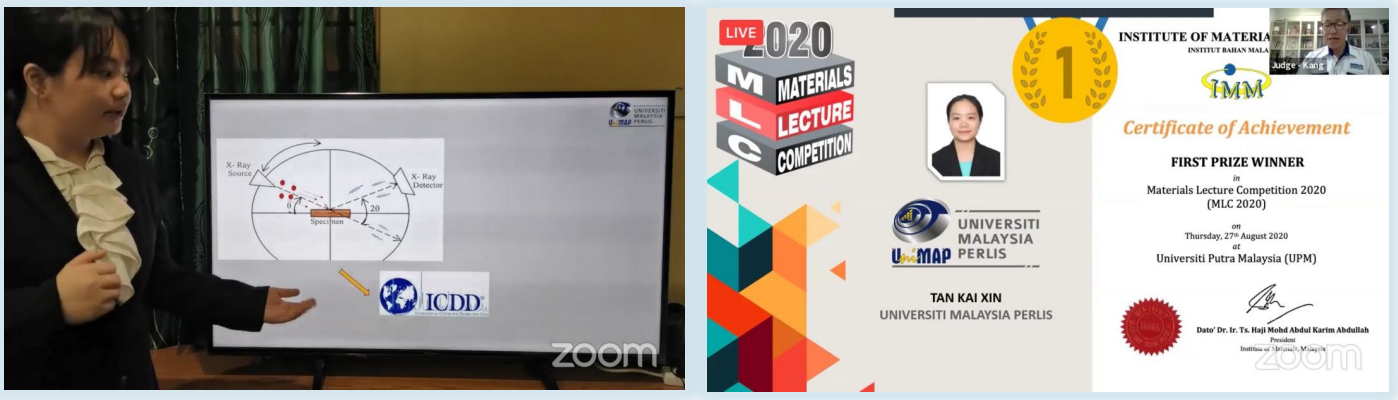


Figure 3: *Ms. Tan Kai Xin from UNIMAP (First Winner of MLC 2020 and Malaysia Finalist in YPWLC 2020*

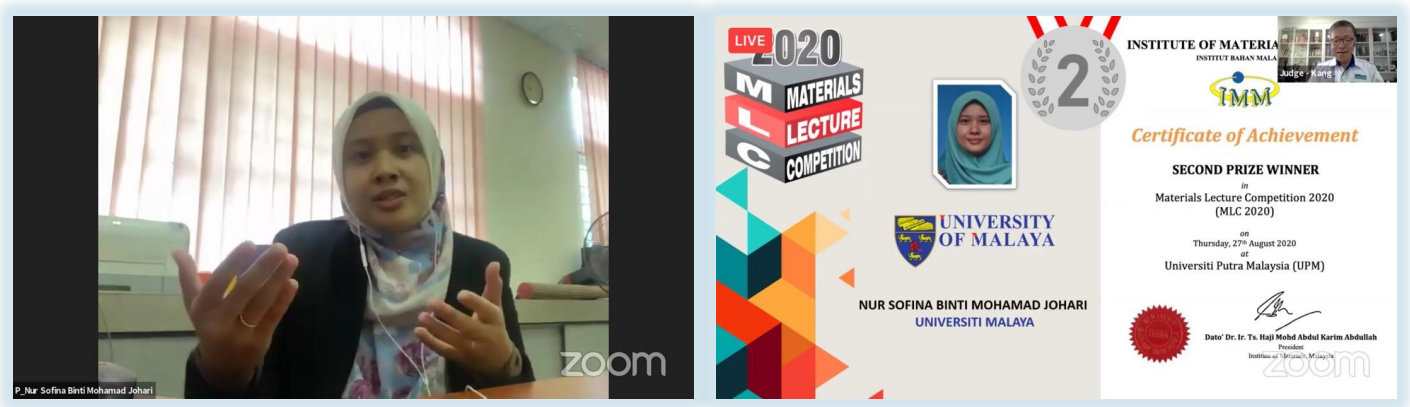


Figure 4: *Ms. Nur Sofina Mohamad Johari from UM (Second Winner of MLC 2020)*

Figure 5: *Mr. Mohamad Fakhrul Ridhwan Samsudin from UTP (Third Winner of MLC 2020)*

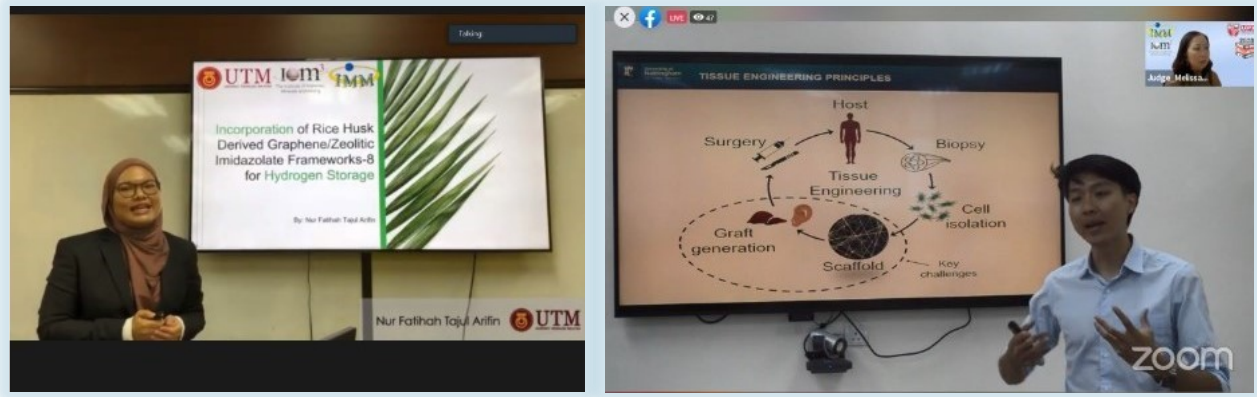


Figure 6: *Ms. Nur Fatihah Tajul Arifin from UTM and Mr. Yong Hsin Nam Ernest from the University of Nottingham Malaysia (MLC 2020 Consolation Prize Winners)*

Figure 7: *Dato' Dr. Ir. Ts. Mohd Abdul Karim Abdullah, IMM President giving the MLC 2020 closing remarks*

UiTM Materials Lecture Competition 2020


Reported by Suhaila Idayu Abdul Halim, Universiti Teknologi MARA, Secretary of UiTM Materials Lecture Competition 2020
Reviewed by Ts. Dr. Tay Chia Chay, Universiti Teknologi MARA

Date: 10th March 2020
Venue: Universiti Teknologi MARA (UiTM), Shah Alam

The UiTM Materials Lecture Competition 2020 (UiTM MLC 2020) was successfully held at the Auditorium 1, Institute of Business Excellence (IBE), Universiti Teknologi MARA (UiTM),Shah Alam on 10th March 2020. This event was successfully hosted by Faculty of Applied Sciences (FSG) and organized by student committees from UiTM, i.e. IMM UiTM Student Chapter, Postgraduate Chemistry Club (PCC) and Applied Sciences Postgraduate Society (ASPS) of FSG. The event was made possible because of the huge and overwhelming support and responses from the students and lecturers from materials science background.

***Figure 1**: The top five finalists and winners of UiTM MLC 2020. From left: Ms. Salma Izati Sinar Mashuri (FSG), Mr. Muhammad Sulaiman Mohd Johari (FSG), Ms. Syafiqah Shaharuddin (FSG), Ms. Nur Anati Jamalluddin (FSG) and Ms. Aunie Afifah Abdul Mutalib (FSG).*

The objective of this competition was to offer a platform for the students of UiTM to express their talent in delivering an effective and impressive presentation in the field of material science. This competition went through a series of sessions, i.e. briefing, pre-screening and finale session for the selection of UiTM representative for Materials Lecture Competition 2020. A total of fourteen students participated in the briefing and pre-screening sessions (which was held on 28th February and 3rd March 2020, respectively) and five of them have made it to the finale of UiTM MLC 2020 which was held on 10th March 2020. The participants who were shortlisted for the finale are listed in **Table 1**.

The finale started at 9.00 am with the arrival of the Honorable guests Prof. Dr. Norizan Ahmat (Head of School of Chemistry and Environment, FSG), Prof. Dr. Hj. Faiz Foong Abdullah (Head of School of Graduate Studies, FSG), Assoc. Prof. Dr. Muhammad Hussain Ismail (Deputy Dean of Research, Industrial Networking and Alumni of Faculty of Mechanical Engineering) and Prof. Dr. Salmiah Kasolang @ Kasalung (President of Society of Mechanical Engineering Livelines, SoMEL). For the final round, the finalists were judged by invited panelists with a background of academia as well as industry. The panelists were Mr. Kang Kim Ang (Corrtrol Group of Companies), Mr. Brian Lim (NTT Quality Construction), Mr. Abdul Rahim Mahamad Sahab (SIRIM Bhd) and Prof. Ts. ChM. Dr. Chan Chin Han (Professor of FSG, UiTM).

***Figure 2**: Group photo of the Honorable guests with participants and audience. From left: Prof. Dr. Hj. Faiz Foong Abdullah (Head of School of Graduate Studies, FSG), Assoc. Prof. Dr. Muhammad Hussain Ismail (Deputy Dean of Research, Industrial Networking and Alumni of Faculty of Mechanical Engineering), Prof. Dr. Norizan Ahmat (Head of School of Chemistry and Environment, FSG) and ChM. Dr. Shahrul Nizam (Advisor of UiTM MLC 2020 Committee).*

This finale was officiated by Prof. Dr. Norizan Ahmat, where she acknowledged and appreciated the initiatives taken by the organizers and collaborators in order to make this event a success. The competition started sharp at 10.00 am with the first finalist and each finalist was given 20 minutes to deliver their presentation. The half-day event of UiTM MLC 2020 ended with the award-winning ceremony at 12.00 pm and followed by closing remarks from the Advisor of UiTM MLC 2020 Committee, ChM. Dr. Shahrul Nizam Ahmad. Ms. Syafiqah Shaharuddin from FSG won the 1st prize (winner), whereas Mr. Muhamad Sulaiman Mohd Johari and Nur Anati Jamalluddin from FSG came in as the 1st- and 2nd-runner up, respectively. The winners were awarded with a cash prize of RM500 (winner), RM300 (1st-runner up) and RM150 (2nd-runner up) together with a trophy and certificates presented by Prof. Dr. Norizan Ahmat. The 1st prize winner of UiTM MLC 2020 will represent UiTM in the semi-final of Materials Lecture Competition 2020 that will be hosted in Universiti Putra Malaysia (UPM) in August 2020.

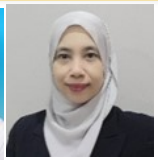
***Figure 3**: UiTM MLC 2020 panel of judges. From left: Mr. Abdul Rahim Mahamad Sahab (SIRIM Bhd), Mr. Kang Kim Ang (Corrtrol Goup of Companies), Mr. Brian Lim (NTT Quality Construction), and Prof. Ts. ChM. Dr. Chan Chin Han (Professor of FSG, UiTM).*

Last but not least, the UiTM MLC 2020 committee would like to take this opportunity to congratulate all the finalists and winners of UiTM MLC 2020 for their eagerness in delivering an effective and impressive presentation. We wish all the best to the UiTM representative for the upcoming competition, Materials Lecture Competition 2020.

***Table 1.** Finalists of UiTM MLC 2020*

No.	Name of Finalist	Topic
1.	Nur Anati Jamalluddin	Immobilized African Catfish (Clarias gariepinus) Visceral Protease: Alternative for Halal Enzyme
2.	Muhamad Sulaiman Mohd Johari	Molecular docking study of flavonoids from Macaranga gigantea towards acetylcholinesterase inhibitory activity
3.	Salma Izati Sinar Mashuri	Methylene Blue degradation under LED light using ZnO/CdS photocatalyst
4.	Aunie Afifah Abdul Mutalib	Sugarcane Bagasse Ash as CaO Catalyst Support for Biodiesel Production
5.	Syafiqah Shaharuddin	Alternanthera sessilis Red: A New Potential Food Colourant

UTHM-IMM Materials Lecture Competition 2020

Reported by Muhamad Khairul Ilman Sarwani, Universiti Tun Hussein Onn Malaysia, IMM-UTHM Student Chapter Chairman

Edited by: Assoc. Prof. Ts. Dr. Hamimah Abd. Rahman, Universiti Tun Hussein Onn Malaysia, IMM-UTHM Student Chapter Advisor

Date: 9th March 2020
Venue: Universiti Tun Hussein Onn Malaysia, UTHM

Universiti Tun Hussein Onn Malaysia (UTHM) Institute of Materials Malaysia (IMM) Student Chapter committee (UTHM-IMM Student Chapter) in collaboration with the BioMaterials Research Focus Group, Faculty of Mechanical and Manufacturing Engineering has successfully organized a University-level Material Lectures Competition (MLC) 2020 at the Post Graduate Student Lounge, UTHM on 9th March 2020. MLC is a national event organized by the IMM and the Institute of Materials, Minerals and Meteorology (IOM3 UK). This national competition was started by IMM with an idea to organize a competition that offers scientists and engineers in Malaysia the opportunity to showcase the significance of materials sciences, engineering and sustainability in the advancement of technology and humankind.

Students from various faculties in the UTHM have joined the competition. During the competition, the participants delivered 15-minute presentations on their work related to the material sciences and engineering. The panels for the competition were led by Assoc. Prof. Dr. Mohd Zamani Ngali, assisted by Dr. Azzura Ismail and Dr. Djamal Hissein Didane. The winner of UTHM MLC 2020 was Rabi'atul Adawiyah Zayadi of the Faculty of Applied Science and Technology (FAST) and she will be representing UTHM at the national-level MLC 2020.

MLC is also a platform for motivating students to perform, improve and excel besides a winning award. Competitions offer an opportunity for participants to gain substantial experience, uncover personal aptitude, and develop their ideas and skills. The committees also expect that more students will participate in the competition and other activities organized by IMM.

***Figure 1**: The UTHM-IMM MLC 2020 Champions. From left: Mr Kartigesan A/L Murugaya (2nd), Miss Rabi'atul Adawiyah Zayadi (1st) and Miss Teoh Lay Ying (3rd).*

***Figure 2**: Candidates, administrators, and representatives of the UTHM -IMM MLC 2020 Student Chapter Committee*

MBOT-TEP Workshop : Examination and Qualification Committee


Reported by Ts. Wan Mohd Arif W. Ibrahim, UniMAP (IMM-MBOT Assessment Panel Committee 2020-2022, Chairperson)
Edited by Ts. Dr. Mahmood Anwar, Curtin University (IMM-MBOT Assessment Panel Committee 2020-2022, Deputy Chairperson)

Date: 9th July 2020
Venue: Begonia Room, Palm Garden Hotel IOI Resort City, Putrajaya

IMM has been officially invited to join as a Technical Expert Panel (TEP) with the Malaysia Board of Technologist (MBOT) for the field of Materials Science and Technology in 2018. Subsequently, the MoU between IMM and MBOT was signed in June 2018. The role of IMM (along with MBOT) is to conduct the professional assessments for the field of Materials Science & Technology with the goal to facilitate recognised Professional Technologists and Certified Technicians among the industry stakeholders.

On 9th July 2020, IMM was invited to join the Examination and Qualification Committee Workshop organised by MBOT at a half-day event held at Begiona Room, Palm Garden Hotel IOI Resort City, Putrajaya. Apart from IMM, representatives from other TEPs including Malaysian Society for Engineering & Technology (MYSET), Malaysian Oil & Gas Services Council (MOGSC), (Technological Association Malaysia (TAM), and Octagon Resolution as well as Jabatan Pembangunan Kemahiran (JPK) have participated in the workshop. Besides that, Universiti Kuala Lumpur (UniKL), Universiti Kuala Lumpur – Malaysia France Institute (UniKL-MFI), Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM) and Jabatan Pendidikan Politeknik were among the academia representatives who also participated in that workshop.

***Figure 1** : Group photo of MBOT-TEP Examination and Qualification committee*

The session began with a welcoming speech from the Chairman, Ir. Ts. Choo Kok Beng, followed by presentations from the respective TEPs. IMM representative, Ts. Wan Mohd Arif W. Ibrahim also presented the professional assessment session conducted by IMM. Although there were various approaches done by TEPs during the professional assessment, however, the methods of evaluation and rubrics need to be conducted according to MBOT's rubric. Nevertheless, MBOT always welcome any suggestions and improvements from the TEP to update and further strenghthen the method of the assessment process.

MBOT Deputy Registrar, Tc. Abdul Hafiz Mohamad Nor presented the Professional Assessment 2.0 to discuss on the methodology to improve the assessment mechanism or procedure. Among the highlights, Written Assessment has been proposed, where Ts/Tc applicants need to prepare a Professional Review Report (PRR) covering all categories of COMPETENCE & COMMITMENT prior to Professional Assessment (Interview) session. Another agenda which has been discussed was conducting a training session by MBOT for the new assessor.

The workshop session was wrapped up by Ts. Mohd Nazrol Marzuke, MBOT Registrar and adjourned with the closing remarks from Ir. Ts. Choo Kok Beng.

***Figure 2** : (Left) Ts. Wan Mohd Arif W. Ibrahim-IMM during the workshop session. (Right) Sharing session by Eur. Ing. Ts. Yeo Cheng Kwan on the professional assessment conducted by MOGSC.*

***Figure 3** : Tc. Abdul Hafiz Mohamad Nor presenting the proposed Professional Assessment 2.0.*

MALAM KIMIA 2020

Friday, 18th December 2020

Malam Kimia 2020 will be held on Friday, 18 December 2020 at the Manhattan II (Level 14), Berjaya Times Square Hotel, 1 Jalan Imbi, 55100 Kuala Lumpur. 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 RM100.00 per person for IKM members and their spouses only and RM200.00 per person for non-members. Companies are welcomed to book a table for RM2000.00.

The closing date for purchase of dinner tickets is 6 December 2020.

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Name: ..... IKM Membership Number:.....

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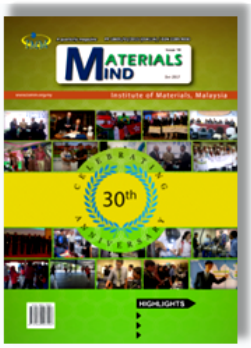

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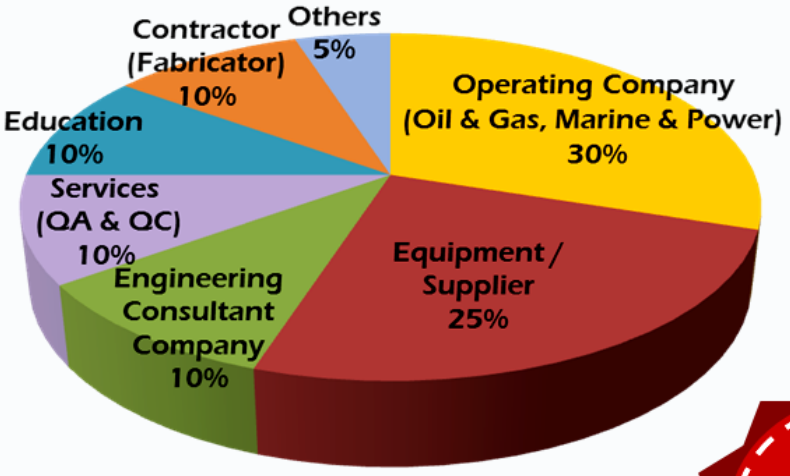

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- JPG / Ai / PDF / PSD Format
  Ai / Illustrator – Text must be outlined and saved together with high resolution picture embedded.
- Image quality should be at least 150 pixel per inch.
- Artwork prepared by the customer.

Payment

Full payment to be made 2 weeks before date of the advertisement.

Cancellation

10-day notice before the advertisement date, otherwise deposit will be forfeited.

PAYMENT NOTE

1) Payment can be made by cheque, telegraphic transfer & bank draft as follows:

Account Name: **Institute of Materials, Malaysia**
Account No: **8009055156**
Swift Code: **CIBBMYKL**
Bank Name: **CIMB BANK Berhad**
Country: **Malaysia**

Cheque can be sent to
Suite 515, Level 5, Block A,
Kelana Center Point (Lobby B),
No. 3 Jalan
SS 7/19, Kelana Jaya, 47301
Petaling Jaya, Selangor
via post/mail or direct bank-in.

2) Payment can also be made by IBG, GIRO or Cash Deposit Machine (CDM) as follows:

Account Name: **Institute of Materials, Malaysia**
Account No: **8009055156**
Bank Name: **CIMB BANK**

Please email your bank-in slip as your payment proof to **secretariat@iomm.org.my**

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