

FREE OF CHARGE

The Institute of Materials, Malaysia and Faculty of Applied Sciences, Universiti Teknologi MARA present

Fingerprinting III
2014

Final Forum on “Towards Fingerprinting of Polymeric Coatings” III

Objective

Each year, oil & gas companies worldwide spend multi-million dollars on polymeric coatings for corrosion protection of steel structures and pipelines for the transportation of crude oil and gas. The frequent failures of the polymeric coatings lead to the corrosion of steel structures and pipelines and thus, leakage of crude oil and gas to the environment. These pose a severe inventory loss to the companies and serious threat to the environment, and also cause many safety issues to plant, personnel and surrounding public. Since mid 90s, PETRONAS, Shell Malaysia, ExxonMobil Malaysia and other oil companies have called for a “mill certification” of the supply of polymeric coatings from local paint manufacturers for the quality assurance of the coatings supplied. However, there was widespread perception within the oil and gas industry that certification of polymeric coatings was not possible because the expertise on spectroscopic analyses and interpretation of results for such purpose was not available back then. Hence, the provision of **Coating Fingerprint Certificate** for polymeric coatings supplied to the oil and gas companies did not materialize.

The Malaysian oil & gas industry had been focusing on the paint quality control inspection, surface preparation (abrasive blasting) and paint spraying application techniques & skills since 1990 to improve coating performance. Despite efforts to improve quality in these 3 skill sets, coating failures continue to get worse. Thus, the oil & gas industry now realizes that the coating materials can be another factor causing the failures. Since materials testing technology, particularly on non-metallic materials, has improved significantly over the past decade, it is timely for the industry to focus on the testing of the coating materials in the same way as metals are tested and issued with a mill certificate.

Forum on “Towards Fingerprinting of Polymeric Coatings” I held on 22nd March 2013, highlighted the prime concerns of the local paint manufacturers, e.g. the protection of product formula, lack of expertise on spectroscopic analyses and interpretation of results. On the other hand, the users of the oil & gas companies suffer from high cost of repainting the steel structures and pipelines when the coatings fail.

A Task Force on Coatings Fingerprinting was set up under IMM in April 2013 to look into the issues brought out by various parties. The end deliverable of this Task Force is to enhance the overall painting coating quality assurance with the aim of ensuring all protective coatings manufacturers supply products according to specifications.

On 11th October 2013, Forum on “Towards Fingerprinting of Polymeric Coatings” II was held. Presentation of the draft of the **Coating Fingerprint Certificate** by Chairperson of the Task Force, Ms. Nurul Asni Mohamed from PETRONAS GTS, was attempted. Refining on the **Coating Fingerprint Certificate** based on the feedbacks during Forum II and periodic meetings of the Task Force will be persistently carried out. The objective of the final Forum on “Towards Fingerprinting of Polymeric Coatings” III is to present the **Coating Fingerprint Certificate** of polymeric coatings, which will be acceptable to the oil and gas companies. The involvement of IMM through multi-lateral discussions and practical trials using the FTIR equipment jointly with the oil and gas operators, paint manufacturers, materials testing organizations and FTIR instrumental specialists over many months have resulted in a new step towards improved quality of paint supply and paint performance in the oil and gas industry.

“Background of “Coating Fingerprint Certificate” can be viewed at <http://www.iomm.org.my/v1/index.php/fingerprint>”



- **Date** : Friday, 20th June 2014
- **Time** : 2.30 pm – 7.00 pm
- **Venue** : Cenderawasih 1 & 2, Glenmarie Golf and Country Club, Shah Alam, Selangor
- **Jointly organized by:**
 1. IMM Polymer Committee
 2. IMM Coatings Committee
 3. Universiti Teknologi MARA, Faculty of Applied Sciences, Shah Alam, Malaysia
- **Co-sponsors :**
 1. Agilent Technologies Sales (M) Sdn. bhd.
 2. Perkin Elmer Sdn. Bhd.
 3. PPG Sigma Coatings
 4. Research Instruments (M) Sdn. Bhd.



Qualification for New Maintenance Painting System and Products for Offshore Application

Mr. Muhd Hawari Hassan,
PETRONAS GTS Dept

Abstract

Corrosive external environment at offshore poses a great deal of challenges for the operators to sustain high integrity and reliability of equipment and piping. Visual inspection reveals that protective coatings failures occur after relatively short span of application. There are many areas for improvement for conventional paint application. This paper highlights the initiative to improve the coating performance through setting up new requirement for testing and qualification prior to site application. Among discussion points are limited surface preparations, simulation of real conditions during applications, testing protocol, challenges and opportunity.

Biodata

Mr. Mohd. Hawari Hasan has been with PETRONAS for over 17 years. After 10 years in refinery, he was transferred to PETRONAS Group Technical Solutions (GTS) and got promoted to Technical Professional position. Under GTS, he serves all PETRONAS OPU's (downstream and upstream sectors, local and abroad) providing technical consultancy especially in Corrosion matters. His responsibilities include PETRONAS Technical Standard Corrosion Discipline Custodian, Development of Corrosion Management Program (CMP), Corrosion Design Basis Memorandum (CDBM) and Asset Integrity Limit (AIL), Pipeline Corrosion Assessment for Process Optimization & Fitness for Service, Corrosion Study for PETRONAS Risk Based Inspection, and Selection and qualification of Protective Coating and Integrity Chemical Injection. He is also the PETRONAS Coating Committee leader.



FTIR Spectroscopic Method for Laboratory Analysis of Polymeric Coatings

Ms. Michelle Lee Jia Yin,
Research Instruments (M)
Sdn Bhd

Abstract

The oil & gas Industry has raised the concerns of polymeric coatings quality and seeks to establish a fingerprinting method to ensure polymeric coatings supplied to the industry can be effectively monitored. The Fourier Transform Infra-Red or FTIR Spectrometer can analyze polymeric coatings to create a base fingerprint which can then be used as a pass-fail reference for daily batch production of polymeric coatings in a paint factory. This presentation will highlight the many trials conducted on various epoxy coatings used in the oil & gas industry. The simplicity of sample analysis by FTIR and interpretation of results with the assistance of FTIR software on epoxy resins and hardeners will be unveiled subsequently. In conclusion, fingerprinting of epoxy resins and hardeners using the FTIR spectrometer in the paint laboratory is possible, reliable and can be accurately reproducible.

Biodata

Ms. Michelle Lee has worked in commercial testing lab as a Technical Chemist. She is experienced in handling various analytical instruments such as HPLC, LCMS, FTIR and UV Spectrophotometer. Currently, she works as an Application Chemist in Research Instruments, and specializes in Thermo Fisher Scientific FTIR. She is responsible for installation, application training and troubleshooting.



Advanced Technology for Polymeric Coatings – What is FTIR Mobile Measurement?

Ms. Chow Mee Ling,
Agilent Technologies Sales
(M) Sdn Bhd

Abstract

Traditionally, polymeric samples are removed and brought to a laboratory for Fourier transform infrared spectroscopy (FTIR) molecular analysis. The rationale for the development of FTIR mobile measurement approach is to enable the analyzer to be brought directly to the site of the polymeric samples, enabling the conditions of the polymeric samples to be assessed non-destructively.

Here, the portable, handheld non-destructive testing analyzers based on FTIR technique as well as some applications on epoxy coatings will be discussed.

Biodata

Ms. Chow graduated with Master of Philosophy (Chemistry) in University of Malaya. She began her career as QA/QC chemist and later on as laboratory manager at Transformer Oil Analysis Laboratory.

Currently, she is the Spectroscopy Product Specialist in Agilent Technologies (M) Sdn Bhd and delivers technical expertise for molecular and atomic spectroscopy solution implementation to the customer, based on application, method development and technical support.



Coating Fingerprint Certificate for Every Batch of Paint Manufactured

Ms. Nurul Asni Mohamed,
PETRONAS GTS, Malaysia

Abstract

The Task Force on Coatings Fingerprinting was set up in April 2013 with the ultimate objective to ensure that protective coatings manufacturers supply products according to specifications. Available standards and specifications requiring fingerprinting of polymeric coatings in the oil & gas Industry were reviewed. Reliability, reproducibility, short duration of analysis (roughly 1 min) and simple data interpretation of FTIR for fingerprinting of raw materials were concluded. Product formulation, which is of prime concern of the paint manufacturers, will be kept secret. Lastly, the template of the Fingerprint Certificate for every batch of paint manufactured will be presented.

Biodata

Ms. Nurul Asni Mohamed is the Principal Engineer (Corrosion) with 14 years of experience in PETRONAS Group Technical Solutions. She has an M. Eng. (Materials Science and Engineering) from Imperial College of Science, Technology and Medicine, United Kingdom. She currently works as an Internal Technical Consultant to PETRONAS upstream and downstream business units based in the headquarter office where she is responsible for the in-house CMP software development and deployment to PETRONAS upstream and downstream facilities as well as the CMP documents development for PETRONAS Terengganu Refinery (PPTSB) Condensate Fractionation Unit, Naphtha Hydrotreating Unit and Mercury Removal Unit. Her other responsibilities include Corrosion Management Plan for PETRONAS, Technical Lead for Sea Cooling Water (SCW) System CMP development for Malaysia LNG (MLNG) plant, Root Cause Failure Investigations & Other Consultancy Services.

Final Forum on “Towards Fingerprinting of Polymeric Coatings” III

Friday, 20th June 2014
Glenmarie Golf and Country Club,
Shah Alam, Selangor

Programme

- 2:30 pm : Registration & Tea/Coffee
- 2:50 pm : Welcoming address by *Prof. Dr. Mohd. Kamal Harun*, President, IMM
- 3:00 pm : Opening Remarks by *Prof. Dr. Khudzir Hj. Ismail*, Dean of Faculty of Applied Sciences, *Universiti Teknologi MARA*
- 3:10 pm : Qualification for New Maintenance Painting System and Products for Offshore Application
(*Mr. Muhd Hawari Hassan, PETRONAS GTS*)
- 3:30 pm : FTIR Spectroscopic Method for Laboratory Analysis of Polymeric Coatings
(*Ms. Michelle Lee Jia Yin, Research Instruments Sdn Bhd*)
- 3:50 pm : Advanced Technology for Polymeric Coatings – What is FTIR Mobile Measurement?
(*Ms. Chow Mee Ling, Agilent Technologies Sales (M) Sdn Bhd*)
- 4:10pm : Tea break
- 4:25 pm : Demonstration of Fingerprinting of Epoxy Coatings by FTIR (bench top and handheld)
- 4: 45 pm: Coating Fingerprint Certificate for Every Batch of Paint Manufactured (*Ms. Nurul Asni Mohamed, PETRONAS GTS*)
- 5:05 pm : Q & A
- 5:35 pm : Summary & Wrap-up by *Assoc. Prof. Dr. Chan Chin Han*, Chairperson, IMM Polymer Committee / *Universiti Teknologi MARA*
- 5:50 pm : Closing Remarks by *Ir. Pau Kiew Huai*, Head, PETRONAS Group Technical Solutions
- 6:00pm : Refreshments & Networking.
- 7:00pm : Adjourn.

Prior Registration required

Free-of-Charge for IMM Members and their Guests

Non-members : RM 40.00

Walk-in Participants : RM 60.00

[Institute of Materials, Malaysia](#)

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**Please register with the IMM secretariat at
putrisalma@mte.com.my by 13th June 2014**

COMMITTEE MEMBERS OF THE TASK FORCE ON COATING FINGERPRINTING

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Deputy chairperson	Ms. Elizah Samat, Sarawak Shell Bhd
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Forum on “Towards Fingerprinting of Polymeric Coatings” I, II & III

COMMITTEE MEMBERS:

Chairperson	Assoc. Prof. Dr. Chia Chin Hua, Universiti Kebangsaan Malaysia
Secretary	Assoc. Prof. Dr. Chan Chin Han, Universiti Teknologi MARA, Shah Alam
Publicity	Dr. Tan Winie, Universiti Teknologi MARA, Shah Alam
Member	Mr. Casey Teh King Chong, Director, TenAsia Corporation Sdn Bhd Ir. Yeoh Eng Huei, Manager, Nippon Paints Marketing Co. (M) Sdn Bhd Mr. Shamsul Farid Samsudin, PETRONAS Research Mr. Imizan B A Bakar, Polymer specialist cum Manager at PETRONAS Chemicals Polyethylene Sdn Bhd. Dr. Chew Khoo Hee, Head of Materials Engineering Division, School of Technology Tunku Abdul Rahman College University