

INSTITUTE OF ADVANCED TECHNOLOGY

NanoScope 2017



SAMPLE:

Zinc oxide flakes on green carbon nanotubes
by Juraina Md. Yusof
(Institute of Advanced Technology)
ITMA Research Officer



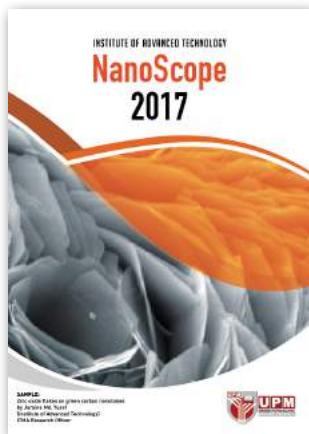
**COVER:**

Image obtained using Ultra High Resolution Scanning Electron Microscope (FESEM).

SAMPLE:

Zinc oxide nanoflakes on green carbon nanotubes
By Juraina Md. Yusof

PUBLICATION COMMITTEE**Advisor**

Assoc. Prof. Dr. Suraya Abdul Rashid

Illustrator & Designing

Marzieana Ab Rahman

Secretary

Muhamad Zuhairi bin Zainul Abidin

News Unit

Intan Helina Hasan

Lab Report Unit

Dr. Syed Muhammad Hafiz Bin
Syed Mohd Jaafar
Juraina Md. Yusof

Cameraman

Ab Haffiz Ab Jalil

CONTACT US

ITMA Publication
Institute of Advance Technology
Universiti Putra Malaysia
43400 UPM Serdang, Selangor

T : +603-8946 7834

E : itma@upm.edu.my

W : www.itma.upm.edu.my

Facebook : www.facebook.com/instituteofadvancedtechnology

Youtube : <http://www.youtube.com/> (Search for : ITMA UPM)

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EDITOR'S PREFACE

Alhamdulillah, all praises to Allah that with His blessings, the Institute of Advanced Technology (ITMA) has successfully published NanoScope 2017.

On behalf of the Publication and Publicity Committee, I would like to extend my appreciation to all ITMA community for actively participating in contributing and providing feedback for NanoScope 2017. Throughout the preparation of this magazine, many individuals from ITMA have taken time to help in various ways. I am also greatly indebted to all the referees for their contribution towards the publication of NanoScope 2017.

This magazine presents ITMA's achievements and activities throughout 2017, as well as research highlights from ITMA researchers, to promote ITMA's research strengths in nanotechnology and advanced materials. ITMA is dedicated to provide information nanotechnology and advanced materials at every level and field of applications. It is hoped that ITMA can intensify networks and linkages to create excellence in research, commercialization and innovation.

I also hope that this magazine will serve its purpose of becoming a reference to those who are studying or are working on nanotechnology and advanced materials, and also to those who wish to venture in new research related to these fields. Finally, I take this opportunity to thank Assoc. Prof. Dr. Suraya Abdul Rashid for her advice in the preparation of NanoScope 2017.



Marzieana Ab Rahman
Editor

marzieana@upm.edu.my

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DIRECTOR'S FOREWORD



Alhamdulillah, all praises to Allah who eased the publication process of our institute's annual magazine, Nanoscope 2017. I would like to express my gratitude to the Publication and Publicity Committee for their contributions throughout the process of preparing this magazine. This magazine compiles all information on the activities and achievements of ITMA specifically in the field of nanotechnology and advanced materials.

Our vision is to become an institute of international repute in the field of advanced materials and nanotechnology. This vision has been our focus in our pursuit to elevate our achievements in research and innovation. ITMA has striven to bring together researchers and students to amalgamate advanced materials and nanotechnology into practice in creative and innovative ways. Therefore, our policies effectuate standards that facilitate the research infrastructures and development of high quality researchers of which will support the research mission of the university.

I hope that ITMA community will continue their excellent work and dedication especially in developing innovations related to nanotechnology and advanced materials. I would also like to congratulate our researchers who have contributed substantially to the institute's output in terms of publications, graduating, post graduate students and patents.

ITMA is always geared towards conducting cutting-edge research as well as providing the best service of high-tech facilities, not only for researchers and students, but also for industry and community involved in the related fields. Our aim is to give full cooperation to all parties in order to achieve our goals, and to be able to introduce new technology to the society in the future, Insyaa Allah.

ASSOC. PROF. DR. MOHD. NIZAR HAMIDON
Director
mnh@upm.edu.my

The Institute of Advanced Technology (ITMA) is a multidisciplinary research institute with an international reputation in the field of Advanced Materials and Nanotechnology. ITMA focuses on areas such as materials synthesis and characterization, materials processing and technology, and materials applications in sensors and functional devices. It supports over 50 researchers and fellows, and over 100 post-graduate students.

In ITMA, we have four main laboratories including the Analytical Laboratory - all within close proximity to ITMA's distinguished technology facilities, giving our researchers direct access to our MS ISO/IEC 17025 accredited laboratory services while encouraging collaboration with industries. We make every effort to provide cutting-edge equipment to help our researchers to carry out research of the highest standard.

OVERVIEW

ITMA

- ## MAIN OBJECTIVES
1. To undertake, coordinate and lead interdisciplinary research and development in cutting-edge areas of advanced technology.
 2. To offer postgraduate training programmes at the M.Sc. and Ph.D levels to local and international students.
 3. To develop a center for dissemination of knowledge and innovative technology and network with universities, laboratories and industry globally.

To become a research institute of international repute in the field of nanotechnology and advanced materials.

VISION

To contribute significantly towards wealth creation, nation building and universal human development through high impact research in nanotechnology and advanced materials.

MISSION

INSTITUTE OF ADVANCED TECHNOLOGY

MISSION & STRATEGIES

1. Conduct interdisciplinary research and development in advanced materials and nanotechnology:

- Establish world-class laboratories and acquire state-of-the art facilities.
- Pool highly trained research personnel.
- Create national and international linkages

2. Offer international postgraduate programs in niche areas:

- Determine and develop niche areas
- Facilitate entry of outstanding students through attractive scholarships
- Establish good research culture

3. Disseminate knowledge and innovative technologies:

- Publish in reputed journals
- Maintain a global network
- Involve in consultancy services

TOP MANAGEMENT



DIRECTOR

Assoc. Prof. Dr. Mohd Nizar Hamidon
mnh@upm.edu.my



DEPUTY DIRECTOR

Assoc. Prof. Dr. Abdul Halim Abdullah
halim@upm.edu.my



SENIOR ASSISTANT REGISTRAR

Din Bin Ayup
dinayup@upm.edu.my



HEAD OF MSCL

Assoc. Prof. Dr. Janet Lim Hong Ngee
hongngee@upm.edu.my



HEAD OF MPTL

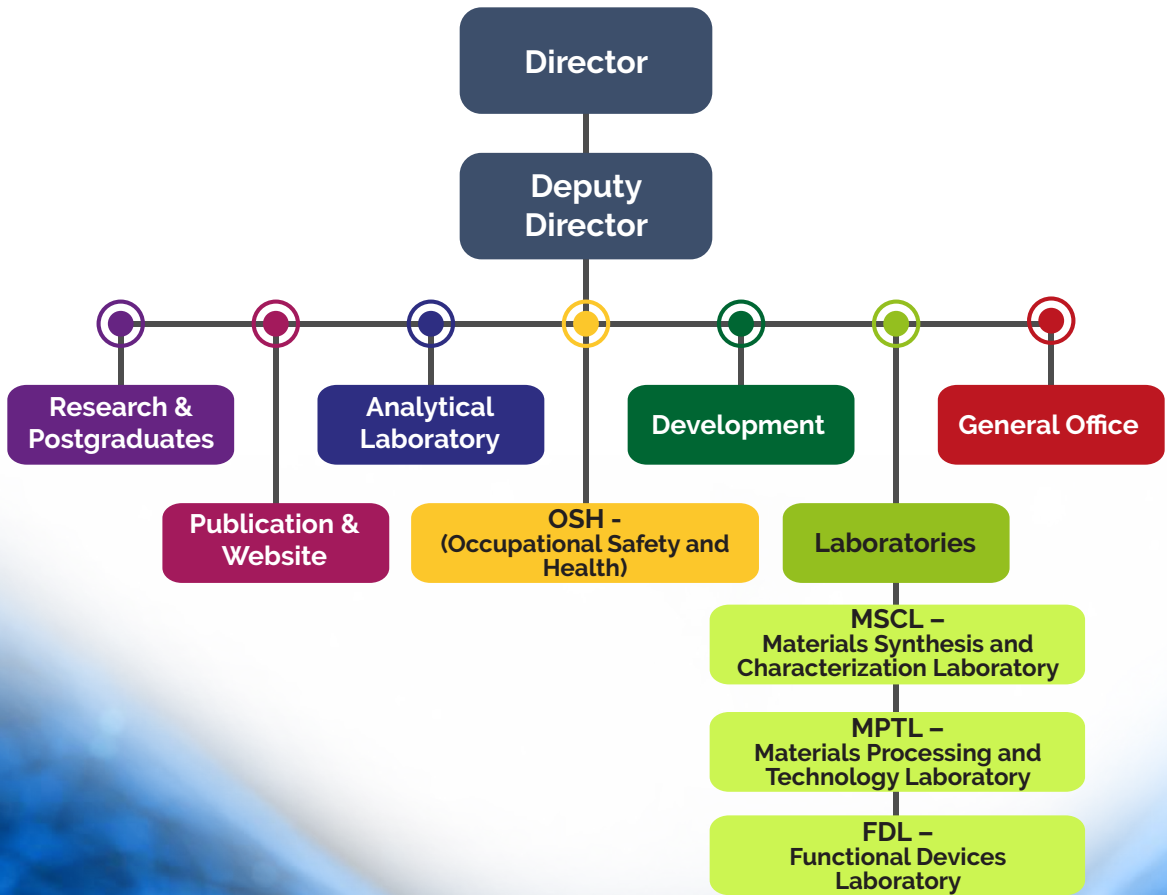
Assoc. Prof. Dr. Suraya Abdul Rashid
suraya_ar@upm.edu.my



HEAD OF FDL

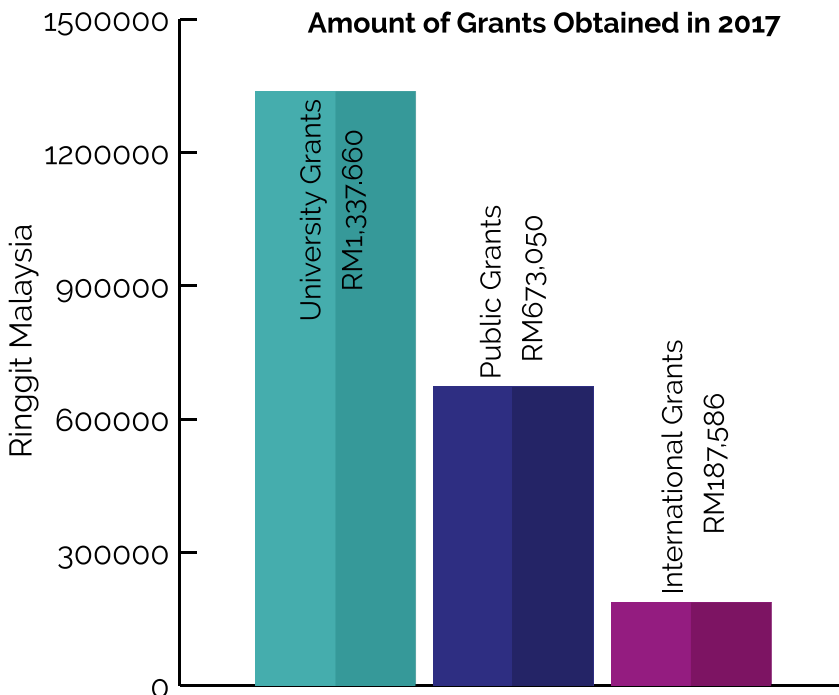
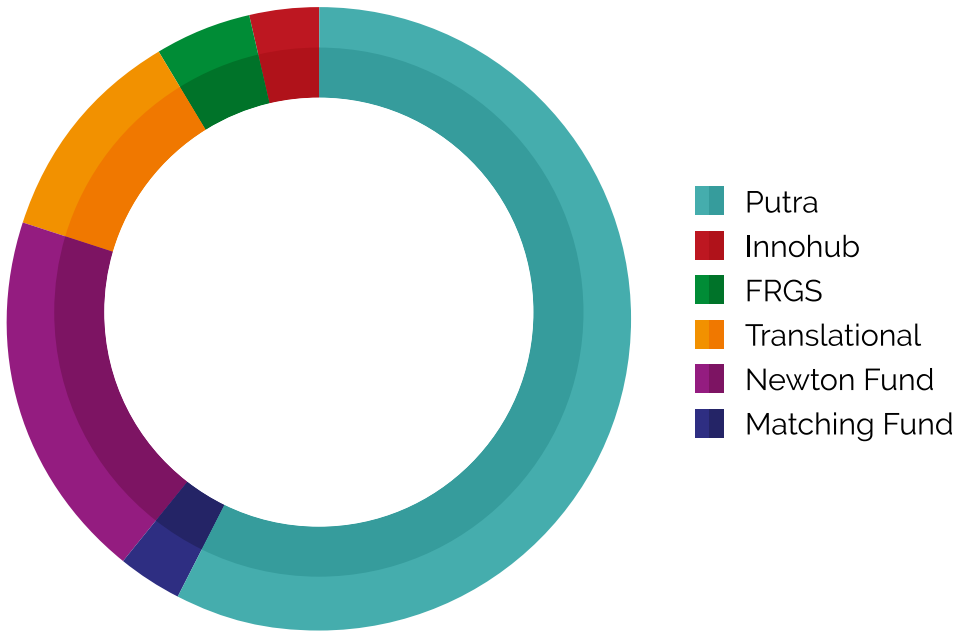
Assoc. Prof. Dr. Suhaidi Shafie
suhaidi@upm.edu.my

ORGANIZATIONAL STRUCTURE



RESEARCH GRANTS

The total revenue of ITMA's research funds in 2017 was MYR 2,198,296. Sources of funds were from Putra Grant (MYR1,267,660), Innohub (MYR70,000), FRGS (MYR423,050), Translational (MYR250,000), as well as the international grants which were from Newton Fund (RM MYR108,586) and Matching Fund from Kyutech (RM79,000). These funding sources were obtained to finance 27 projects led by ITMA.



PUBLICATIONS 2017

Key Performance Indicator (KPI)	2017 Target	2017 Achievement
Citation	352	4090
Journals	150	182
Conference Proceedings	10	19
No. Publications in Q1 & Q2	89	116
Percentage of Publication in Q1 & Q2	59%	64%
Publication in Other Journal	15	10

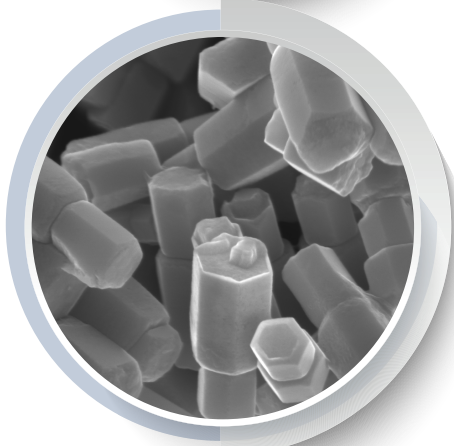
Key Performance Indicator (KPI) of Publications in 2017

PATENTS 2017

NO.	APPLICATION NO.	INVENTOR	PATENT NAME	COUNTRY
1	Pl2017700106	Prof. Dr. Nor Azah Yusof	Targeted Drug Delivery	Malaysia
2	Pl2017700345	Prof. Dr. Nor Azah Yusof	Method of Preparing A Nanowire Composite Electrode	Malaysia
3	Pl2017702231	Dr. Jaafar Abdullah	A PNA based biosensor system for detection of Mycobacterium tuberculosis in a sample	Malaysia
4	PCT / MY2017 /050055	Assoc. Prof. Dr. Suraya Abdul Rashid	Preparation of Carbon Quantum Dots	Malaysia

ACHIEVEMENTS

Certificate of accreditation by International Standard ISO/IEC 17025 : 2005



March 17, 2017 - Institute of Advanced Technology was awarded with the International Standard of ISO/IEC 17025: 2005 for Chemical & Mechanical/Physical Testing as the replacement of SAMM 763 dated 25 March 2016. The main purpose of the accreditation is to set a benchmark for performance, to enhance marketing advantages by promoting certified laboratory services to potential customers, and to gain international recognition with the technical competencies.

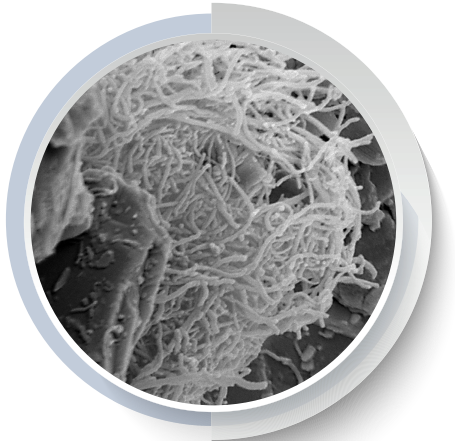
ITMA is committed to provide testing services of the highest quality using a variety of equipments to meet the needs of research, especially in the areas of advanced materials and nanotechnology.



Mass Micrograph Award 2017

August 8, 2017 - A total of 10 students from ITMA participated in the 6th international Conference on Solid State Science and Technology (iCSSST 2017). Mass Micrograph Award 2017 is jointly organized by Advanced Optical Material Research Group (AOMRG) Universiti Teknologi Malaysia, Malaysia Solid State Science and Technology Society (MASS) and Hi-Tech Instruments, Malaysia.

This contest is an excellent opportunity for students to develop their understanding on the micro and sub micro-morphology of materials.



Muhammad Syazwan bin Mustafa

Institute of Advance Technology (ITMA), UPM

Supervisor : Dr. Raba'ah Syahidah Azis

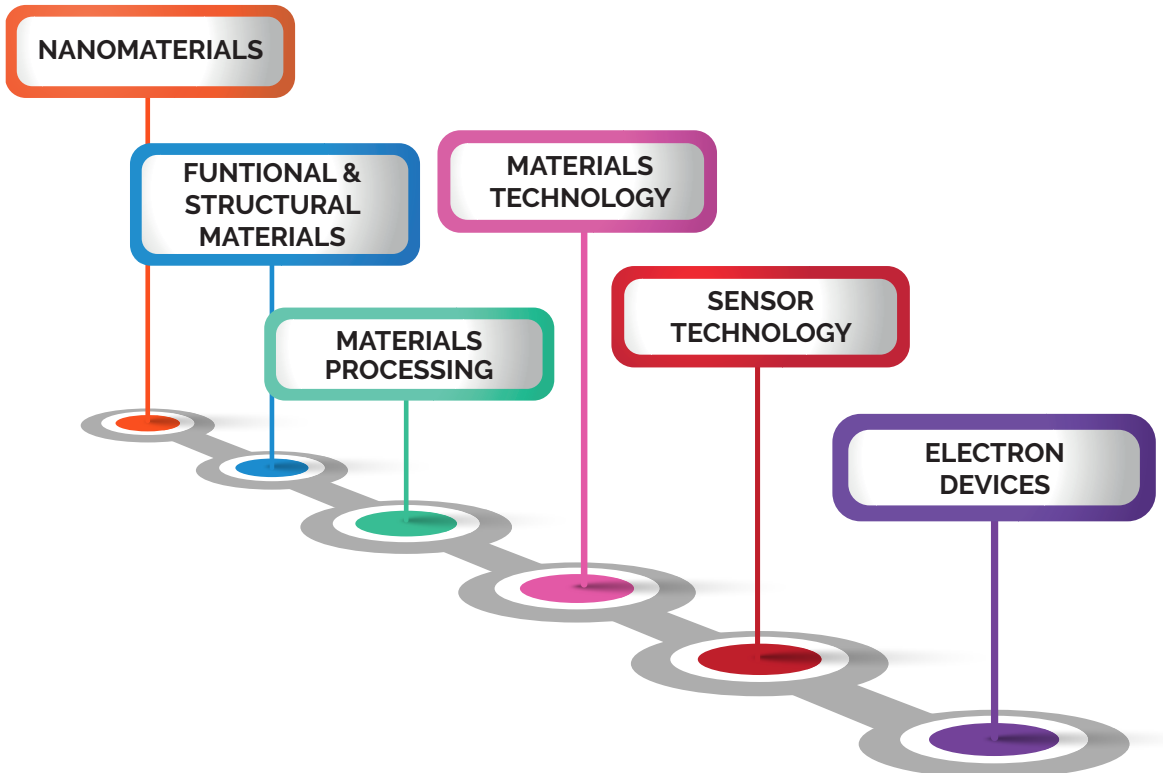
3RD PLACE

MASS MICROGRAPH AWARD

6 TH INTERNATIONAL CONFERENCE ON SOLID STATE
SCIENCE AND TECHNOLOGY (ICSSST 2017)

SAMPLE COMPOSITION: Mg-Ti substituted barium hexaferrite + MWCNT

RESEARCH PROGRAMS



RESEARCH HIGHLIGHTS

Synthesis Of Green Zinc Oxide - CNT Cotton Hybrid

Cooking palm oil is widely used in consumer food chain all around the world. Nowadays the demand has tremendously escalated due to the influx of small and medium enterprises (SMEs) into the food and beverages manufacturing industry. Due to that, the amount of waste cooking oil has increased simultaneously which leads to uncontrolled dumping and discharging into the environment. This has become our major concern over its effects towards environmental ecosystem and biodiversity. In order to solve this problem, this project looks into how waste cooking palm oil (WCPO) could be recycled and turned into economic potentials. This is in line with Malaysia's Economic Transformation Program Area (NKEA) that among others is focusing to develop an efficient solid waste management system to indirectly contributes for higher Gross National Income (GNI) for the country.

From previous studies, carbon nanotube cotton (CNTC) is a special type of CNT which exhibit good electrical conductivity thus making it a promising substrate to improve the performance of piezoelectric nanogenerator. The CNTC plays a major role in enhancing the efficiency of the nanogenerator in nanoscale devices by its outstanding charge carrier mobility as compared to other common substrates such as silicon and metal. The advantages of using WCPO as the carbon feedstock in the synthesis of CNTC are because it is inexpensive and has no issue on shortage of supply. Furthermore, CNTC is a very flexible material and is comparable to commercial flexible substrates that are commonly used in mobile electronic devices such as polyethylene terephthalate (PET), polyethersulfone (PES) and polyethylene naphthalate (PEN). Its non-brittle property and flexibility to be bent or folded makes it a novel green material substitution for regular commercial substrates.



Juraina Yusof

MPTL Research Officer
juraina@upm.edu.my

In this project, zinc oxide (ZnO) is identified to be a suitable material to be hybridized with CNTC as piezoelectric nanogenerator due to its semiconductor and piezoelectric properties that are relatively safe and biocompatible. If proper synthesis parameters are applied, a desired growth of ZnO nanostructures on CNTC can be achieved. This research is looking into the potential of CNTC as a substrate with high carrier mobility and flexibility for improved piezoelectric nanogenerator, which to our knowledge has not been investigated before. It is expected that the combination of CNTC from WCPO and ZnO will result in an efficient piezoelectric nanogenerator with significant electrical properties for various applications in nanoscale electronic devices. Besides, this beneficial approach will help promote a greener environment by recycling WCPO.

CNTC from WCPO was synthesized using chemical vapor deposition (CVD) reactor with certain fixed parameters that enable the formation of CNTC in the tube furnace. WCPO, iron catalyst and thiophene as growth enhancer were mixed together and injected into the quartz tube for 30 minutes. The hybridization of zinc oxide and CNTC was carried out using 3 electrodes setup in electrochemical deposition (ED) process. The CNTC was dedicated as the working electrode, platinum as the anode and saturated calomel as the reference electrode. Another method used was chemical bath deposition (CBD) in which CNTC was immersed in a solution containing zinc ion and hexamethylenetetramine as the capping agent.

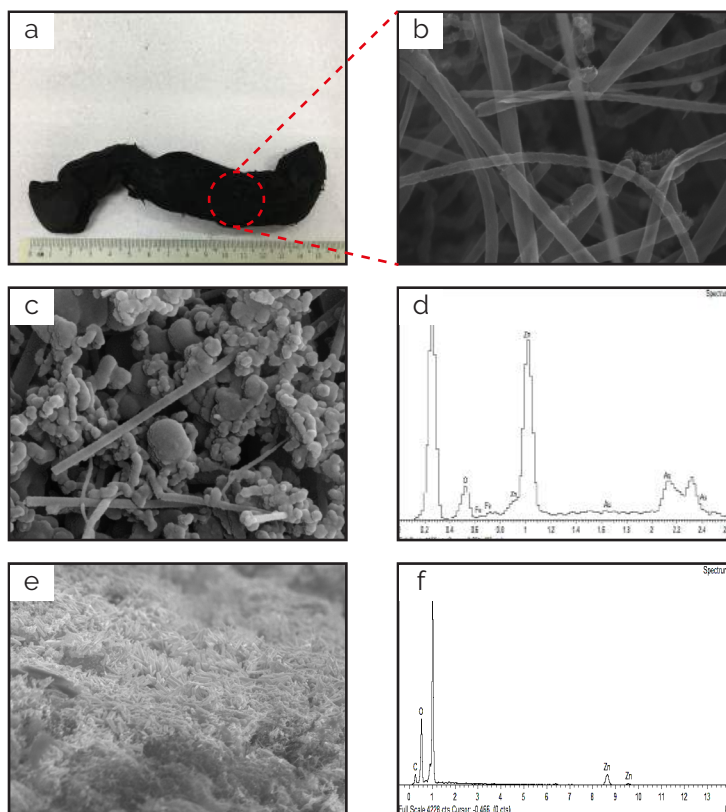


Fig. 1.(a) CNT cotton , (b) FESEM images of CNT cotton, (c) CNTCZnO hybrid by ED (d) EDX analysis of CNTCZnO by ED (e) CNTCZnO hybrid by CBD and (f) EDX analysis of CNTCZnO by CBD.

The physical appearance of carbon nanotubes cotton (CNTC) which resembles cotton sponge or cotton candy that is soft, fluffy and lightweight can be seen in Fig. 1(a). Meanwhile, Fig. 1(b) shows the FESEM image of CNTC which consists of a mixture of long and short truncated nanotubes.

Fig. 1(c) shows the image of CNTC after being hybridized with ZnO using electrochemical deposition method. It can be observed that the diameter was getting bigger due to the coatings of ZnO along its tubular shape. Fig. 1 (d) shows the quantitative EDX analysis of the sample compositions coated with gold, yielded C 50.51%, O 8.27% and Zn 22.59% which confirms the presence of ZnO on the CNTC. Fig. 1(e) shows the FESEM image of CNTCZnO hybridization revealing a dense array of ZnO nanorods of uniform length grown around the confinement of the CNT cotton tubular surface.

Meanwhile, in Fig. 1(f), the quantitative EDX result confirmed the presence of zinc oxide on CNTC using CBD method by 21.7% Zn, 63.0% C and 15.2% O.

CNT cotton has successfully been synthesized from chemical vapor deposition process using waste cooking palm oil as the carbon source. Zinc oxide has successfully been deposited on the CNT cotton (CNTC) using electrochemical deposition and chemical bath deposition method. The diameter of CNTC which consisted of SWCNT and MWCNT increased after the coating of ZnO layer along its tubular shape. The hybridization of CNT cotton which is mechanically strong, light weight, excellent conductors of heat, and transport electrons with zinc oxide is promising to be applied as flexible piezoelectric nanogenerator in nano scale devices.

Laser Ablation Synthesis of Metal Nanoparticle in Vegetable oil

The application of the laser ablation technique offers a unique tool for nanofabrication. When laser ablation is used to produce metal nanoparticles in an aqueous solution, the nanoparticles are released inside the solution, and nanofluid is formed. The properties of nanoparticles using laser ablation are unique, and they are not reproducible by any other method. For example, the fabrication of copper, silver, gold and nickel nanoparticles (NPs) in liquid do not require any chemical reduction agent, and dimension control is easier than with chemical methods.

A big challenge in the synthesis of NPs is agglomeration and collapsing their colloidal via precipitation or flocculation due to thermodynamic principals. This tendency can be inhibited by stabilization of NPs with chemical species. This provides obstacles for NPs agglomeration through charge stabilization and steric stabilization. Therefore, much effort has been undertaken to develop different ligands as colloidal stabilizers. Recently, synthesis of NPs using fatty acids (oleic and lauric acid) as stabilizers has been reported. These organic compounds are amphiphilic molecules with polar carboxylic group, which is able to coordinate to NPs and non polar long carbon chains that prevent NPs agglomeration through steric repulsion. As an example of this kind of preparation, recently, researchers reported vegetable oils as stabilizing agents for preparation of NPs. One of the four commercial vegetable oils traded on the world market is palm oil which is cheaper than canola, walnut, and rapeseed oil.



Dr. Amir Reza Sadrolhosseini

FDL Research Fellow
amir.reza@upm.edu.my

Figure (1) shows the laser ablation setup which contains Nd:YAG Q-switched high power laser, a liquid cell, a stirrer, a lens and a precision travel stage. The metal plate (gold, silver, copper, etc.) was immersed in 20mL of vegetable oil, and the ablation was carried out via a pulsed Q-Switched Nd:YAG laser which was focused on the target with lens at different time. To disperse the NPs in the oil, a magnetic stirrer was used during the ablation process.

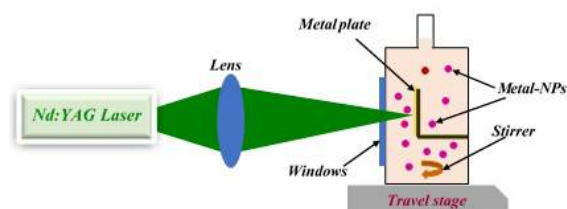


Fig. 1. Laser ablation setup for synthesis of metal nanoparticles.

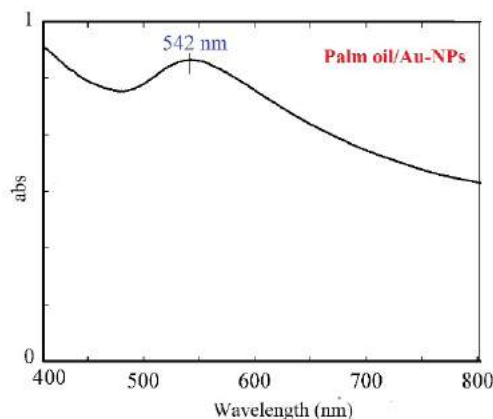
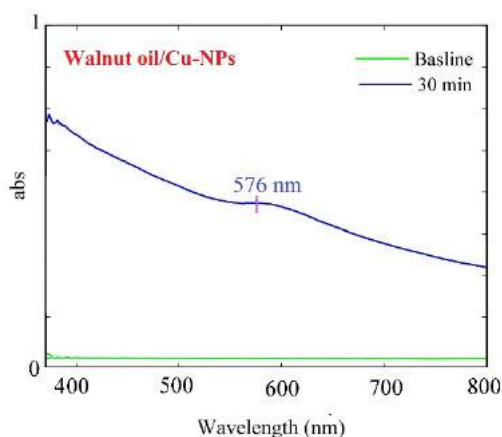


Fig. 2. UV-visible spectrum of copper nanoparticle and gold nanoparticle in walnut oil and palm oil.

Palm and walnut oils are very stable towards oxidation due to a maximum proportion of saturates compared to all vegetable oils. Hence; the gold and copper targets were ablated in palm oil and walnut oil respectively. The copper nanoparticle and the gold nanoparticle formed in the walnut oil and palm oil.

The UV-visible (Figure (2)) peaks based on localized surface plasmon resonance were arose around 540 nm, 570 nm, respectively. The Fourier transform infrared (FT-IR) spectrums show the peak around 360 cm^{-1} and it confirms the functional groups of oil are constant. (Figure (3)). The transmission

electron microscopy image authenticated the nanoparticles formed in spherical shape (Figure (4)), and the average particle size is about 15 nm.

Gold and copper nanoparticles formed in vegetable oils in the spherical shape with particle size about 15 nm. The localized surface plasmon resonance peaks appeared in the green and yellow ranges of UV-Visible spectrum. The tail of carbonyl band capped Cu-NPs and Au-NPs. Consequently, the laser ablation technique is a green and simple method for the synthesis of gold and copper nanoparticles in the presence of fatty acids.

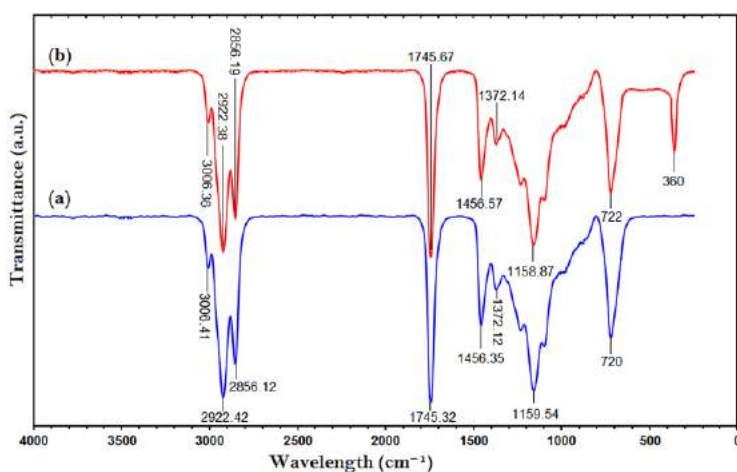


Fig. 3. The FT-IR results show the metal nanoparticle formed in the vegetable oil and the functional groups of oil are constant.

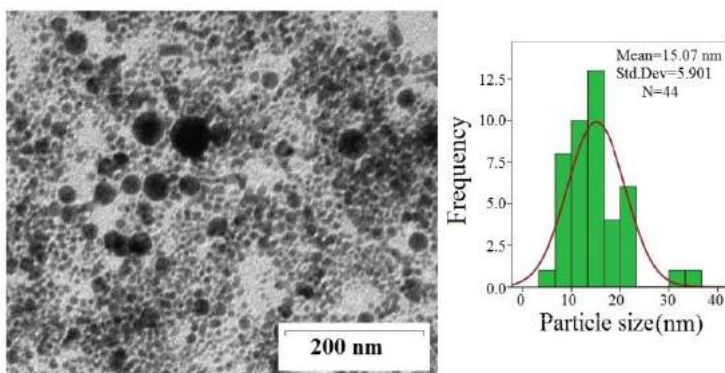


Fig. 4. The TEM image shows the nanoparticles formed in spherical shape and the average size is 15.07 nm

Application of Density Functional Theory for Simulation and Modeling of Graphene Quantum dots



Dr. Amir Reza Sadrolhosseini

FDL Research Fellow
amir.reza@upm.edu.my

Density functional theory (DFT) is an advance application of quantum physics to calculate the electronic structure of materials and molecular modeling and it is a significant technique to study the molecular structure of many chemical and biological components.

In our research group, density functional theory was used to model and predict the molecular structure of nanomaterial using Gaussian software. Figure 1 shows the total energy, bond angle and dipole momentum of graphene oxide quantum dots (GOQD)

and reduced graphene oxide quantum dots (RGOQD). Moreover, the optimization of molecular structure of GOQD and RGOQD were predicted with DFT (Figure 2). The charge distribution of GOQD and RGOQD were drawn using Avogadro software (Figure 3). The molecular modelling based on DFT was continued for other nanostructure based on graphene structure using Gaussian 16.

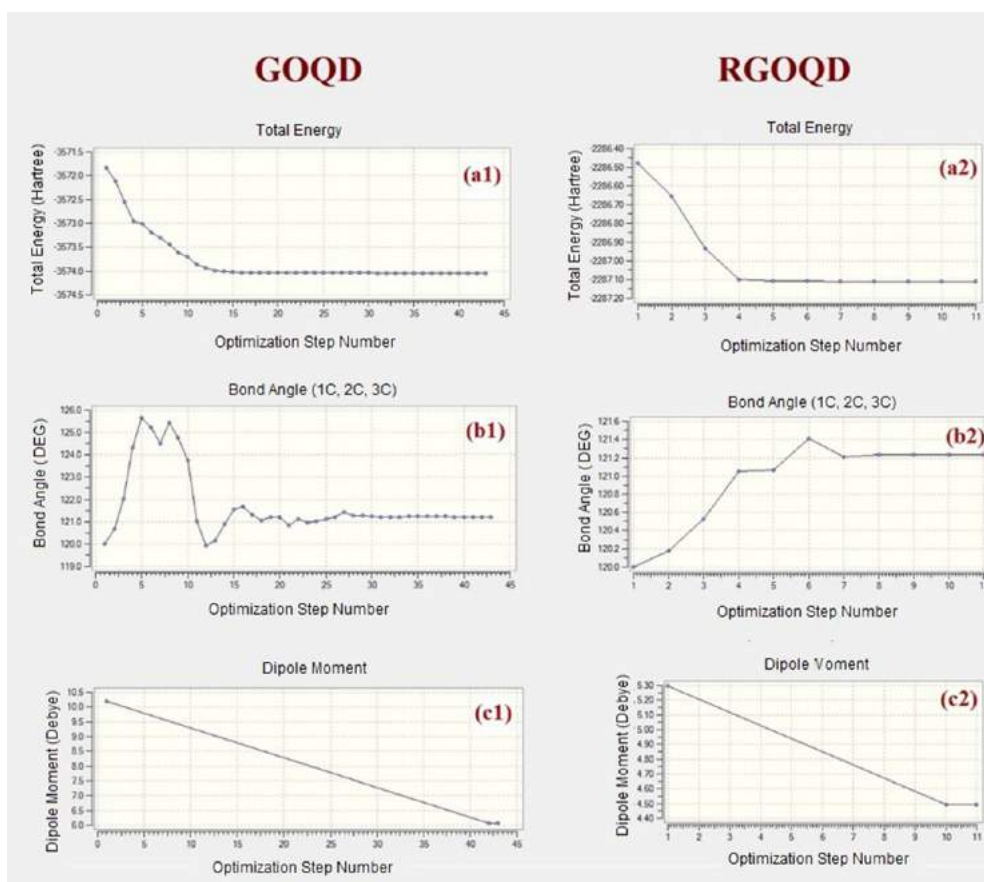


Fig. 1. a) Total energy of GOQD and RGOQD

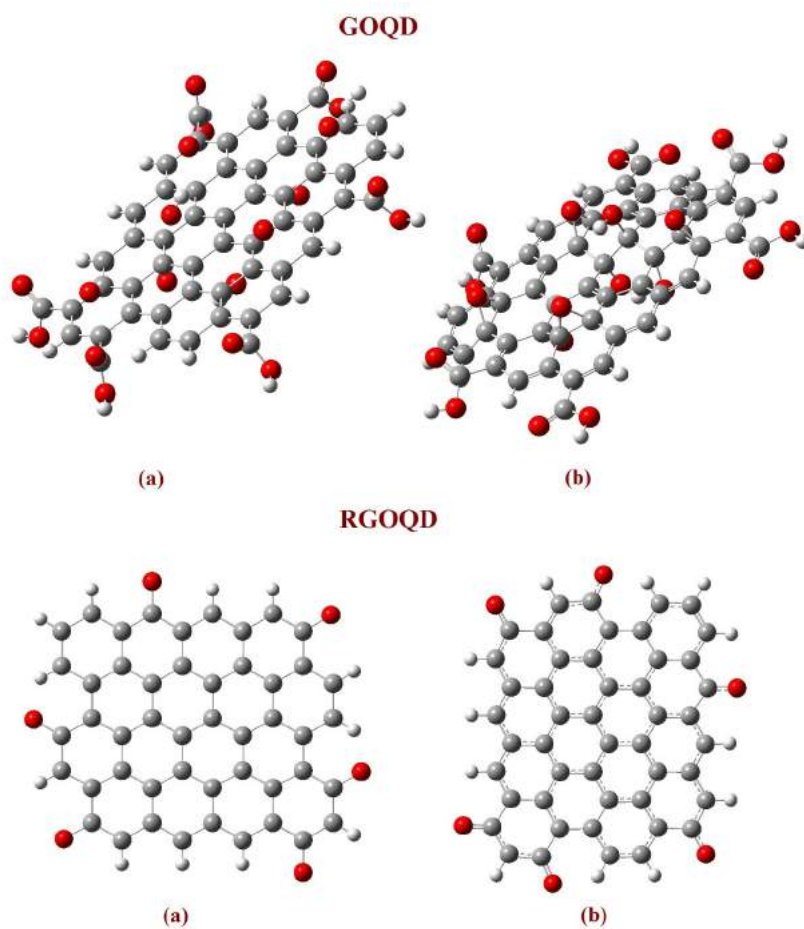


Fig. 2. The molecular structure of GOQD and RGOQD in the stable form.

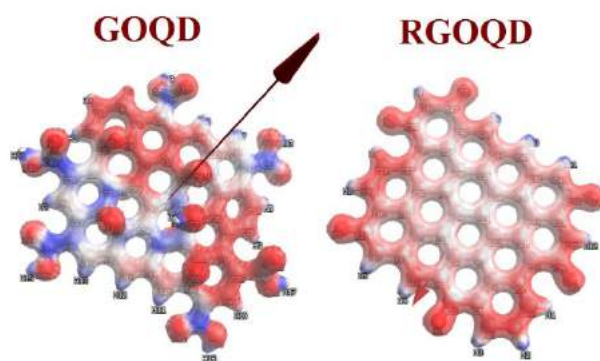


Fig. 3. Charge distribution on the surface of GOQD and RGOQD.

Surface Plasmon Resonance sensor for detection of toxic chemical

The surface plasmon resonance (SPR) sensor is a versatile technique to detect heavy metals, biomolecules and toxic materials. In order to enhance the sensitivity, selectivity, and accuracy of the SPR sensor, the gold or silver layer should be modified by polymer layer. Hence, polypyrrole, polypyrrole chitosan, and polypyrrole/multi-walled carbon nanotubes are used to improve the pertinent parameters of the SPR sensor.

Polypyrrole, polypyrrole-chitosan, polyanilin, and polythiophene have particularly optical, thermal stability and high conductivity. They have π -electron conjugation which is responsible for electronic properties, low energy optical transition and high electron affinity. Generally, the sensing mechanism of polypyrrole can involve the oxidation-reduction, chain conformational changes and ion or molecule adsorption and desorption which are considerable in surface plasmon sensor. Thus, they are useful as sensor and biosensors. Recently, polypyrrole nanoparticles have been fabricated to improve the chemical and physical properties of this polymer.

Graphene oxide is a two-dimensional material that has a single atomic layer.²⁸ The hydroxyl (OH-) and epoxy (-COO-) groups are the main functional groups in GO molecules at the basal plane and carboxyl groups (-COO-) at the edge of the molecular structure.^{29,30} GO is not appropriate for some electronic applications because it is an electrical insulator; hence, removing oxygen containing group enhances the electrical properties, that is reduce graphene oxide (rGO).³¹

Given these characteristics, nanocomposite layer consisting of polypyrrole nanoparticles and reduced graphene oxide (PPy-NPs/rGO) was fabricated using the electrochemical deposition method. The layers were characterized using a Field Emission Scanning



Dr. Amir Reza Sadrolhosseini
FDL Research Fellow
amir.reza@upm.edu.my

Electron Microscope (FE-SEM, Figure (1)) and Fourier Transform Infrared (FTIR, Figure (2)) Spectroscopy. The characterized PPy-NPs/rGO layer was used to detect the pyrene using the SPR technique.

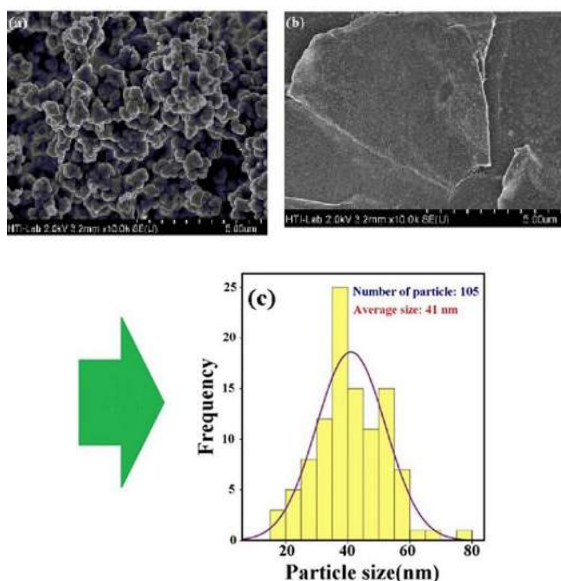


Fig. 1. FE-SEM images: (a) PPy layer, (b) PPy-NPs/rGO nanocomposite layer (c) analysis of (b) and (c) showing the particle size of PPy-NPs to be 41 nm.

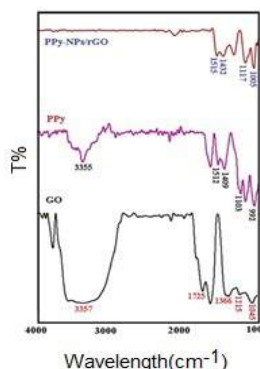


Fig. 2. FT-IR results related to PPy-NPs/rGO and the PPy layers.

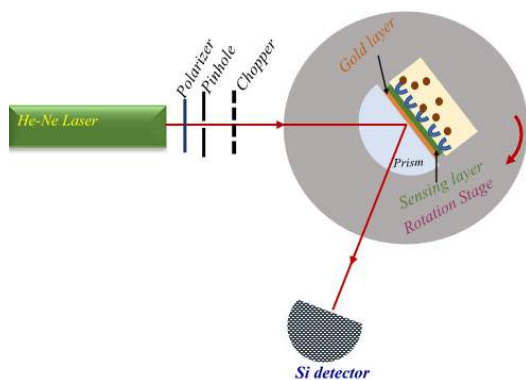


Fig. 3. SPR setup which contains He-Ne laser, a polarizer, a pinhole, a chopper a rotation stage a silicon detector and a tank.

Fig. (3) shows the SPR setup which contains a prism, a He-Ne laser, a polarizer, a pinhole, a chopper a rotation stage a silicon detector and a tank. The SPR signal was registered when the rotation stage was stopped momentarily (Figs. (4)). Figs. (5) and (6) depict the variation of resonance angle with time and concentration of pyrene. Consequently, the SPR sensor using PPy-NPs/rGO sensing layer become saturate about 600 s and the limitation of PPy-NPs/rGO sensing layer was about 0.01 ppm.

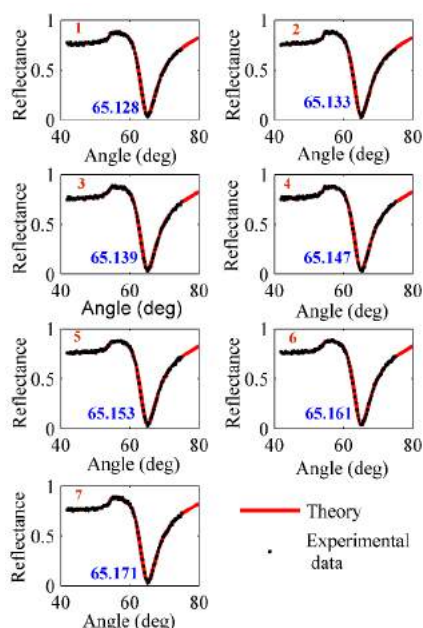


Fig. 4. SSPR signals registered to measure the refractive indexes of the solutions containing pyrene at the following concentration: 1) 0.01 ppm; 2) 0.05 ppm; 3) 0.1 ppm; 4) 0.5 ppm; 5) 1 ppm; 6) 5 ppm; 7) 10 ppm (The thickness of the gold layer was 49 nm).

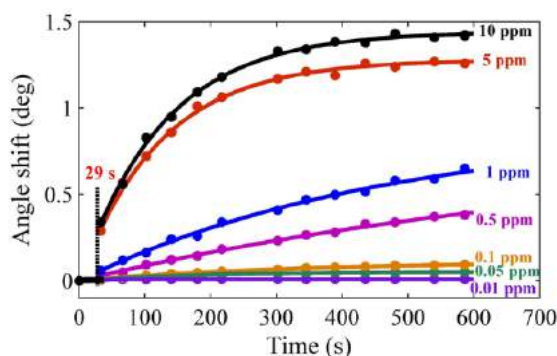


Fig. 5. Variation of angle shift versus time (sensogram) for PPy-NPs/rGO for the detection of different concentration of pyrene ranging from 0.01 to 10 ppm.

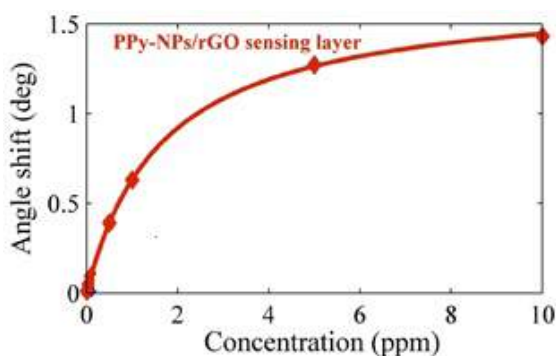


Fig. 6. Variation of angle shift versus the concentration of pyrene.

Conclusion

The PPy-NPs/rGO can detect the PAHs toxic chemical. The pyrene interacted with the π -bonds in the nanocomposite layer, and the limitation of the PPy-NPs/rGO nanocomposite layer was about 0.01 ppm.

The composite will be improved by quantum dot nanostructure, and the research will be continued to detect the other PAHs and achieve the high sensitive sensor.

LABORATORY

MATERIALS SYNTHESIS AND CHARACTERIZATION LABORATORY (MSCL)

Materials Synthesis and Characterization Laboratory (MSCL) was established on 1st November 1999. It was formerly known as Advanced Materials Research Center (AMRC) and later was changed to Advanced Materials Laboratory (AML). In line with university's restructuring, its name was changed to Advanced Materials and Nanotechnology Laboratory (AMNL) in 2006. Recent restructuring in 2012 has seen AMNL evolving to Materials Synthesis and Characterization Laboratory (MSCL) to be in tune with advanced materials and nanotechnology research focus. This laboratory is one of the three research laboratories under the Institute of Advanced Technology (ITMA). MSCL focuses in three main activities :

1. Interdisciplinary research and development work in advanced materials and nanotechnology.
2. Postgraduate research programs.
3. Dissemination of innovative knowledge and technologies in advanced materials and nanotechnology.

OBJECTIVES

1. To be a leading research centre in advanced materials and nanotechnology.
2. To develop world class research laboratory in advanced materials and nanotechnology.

3. To disseminate knowledge and innovative technologies through publications, seminars and conferences.

MSCL Research Group

Nanomaterials

This program focuses on the synthesis and characterization of nanomaterials and their building blocks which involves the use of nanosized materials. The study of these materials covers the fundamental aspects towards their potential application. The research on nanocomposite materials and nanostructured materials includes but is not limited to nanometals, nanoalloys, nanoceramics, carbon nanotubes and layered double hydroxides.

Functional and Structural Materials

This program focuses on synthesis and characterization of nanomaterials and their building blocks which involves the use of nanosized materials. The study of these materials covers the fundamental aspects towards their potential application. The research on nanocomposite materials and nanostructured materials includes but not limited to nanometals, nanoalloys, nanoceramics, carbon nanotubes and layered double hydroxides.



Laboratory Members

Assoc. Prof. Dr. Janet Lim Hong Ngee

Head of Laboratory
B.Sc.(UKM), M.Sc.(UKM), Ph.D (UPM)
Expertise :
Analytical Chemistry, Materials Chemistry

Prof. Dr. Mohd Zobir Hussein

Head of Nano Materials
B. Sc. (Hons) (UKM), Ph. D (Reading, U.K)
Expertise :
Nano Materials and Materials Chemistry

Prof. Dr. Zulkarnain Zainal

Research Associate
B. Sc. (Hons) (UKM), Ph. D (UMIST, U.K)
Expertise :
High TC Superconductor, Magnetic Materials, Thin Films Physics

Prof. Dr. Taufiq Yap Yun Hin

Research Associate
B. Sc. (Chemistry) (UPM), M. Sc. (UPM), Ph. D (UMIST, U.K)
Expertise :
Heterogeneous Catalysis, Selective Oxidation, Advanced materials, Renewable Energy, Biodiesel Production, Biomass Conversion, Hydrogen production and Natural Products Chemistry

Assoc. Prof. Dr. Abdul Halim Abdullah

Research Associate
B. Sc. (Hons) (New Brunswick), Ph. D (Dundee, U.K)
Expertise :
Materials Chemistry

Assoc. Prof. Dr. Jumiah Hassan

Research Associate
B. Sc. (Northern Illinois, U.S), M. Sc. (Washington State, U.S), Ph. D (UPM)
Expertise :
Dielectric Properties of Materials At Microwave and Low Frequencies

Dr. Md Shuhazlly Mamat @ Mat Nazir

Research Associate
B. Eng (Hons) (Nottingham, U.K), Ph. D (Nottingham, U.K)
Expertise :
Carbon nanostructures : Synthesis and Application
Nanomaterials Characterizations PEM Fuel Cells and Electrolysers
Nanomaterials Characterizations

Dr. Ismayadi Ismail

Research Officer
B. Sc. (UKM), M. Sc. (UPM), Ph. D (UPM)
Expertise :
Magnetic Materials

Rosnah Nawang

Research Officer
B. Sc. (USM), M. Sc. (USM)
Expertise :
Polymer Technology

Sarinawani Abdul Ghani

Science Officer
B. Sc. (UPM)
Expertise :
Nanomaterials

Nazrul Abdullah

Assistant Engineer
Diploma of Mechanical Engineering
Bachelor of Engineering (Mechanical)
Expertise :
Repairing of Computers and Electrical Equipment, Design 3D modeling using Autodesk Inventor and Catia

Mohd Kadri Masaud

Assistant Engineer
Certificate of Electronic Engineering (Relationship)
Diploma of Electronic Engineering
Expertise :
Repairing of Computers and Electrical Equipment

Noor Lina Shamsuddin

Assistant Engineer
Certificate of Power Electronic Engineering
Diploma of Electronic Engineering
Expertise :
Repairing of Computers and Electrical Equipment

MATERIALS PROCESSING AND TECHNOLOGY LABORATORY (MPTL)

Materials Processing and Technology Laboratory (MPTL) was established to fulfill the research necessity in Advanced Materials Processing and Nano Materials. MPTL was developed to complement the ITMA ecosystem, which aims to be a leader in the field of Nanotechnology and Advanced Materials. MPTL focuses on developing and promoting research in Materials Technology and Advanced and Nano Materials Processing in Malaysia.

The main activities of the laboratory are :

1. Conducting research in related fields.
2. Postgraduate research programs.
3. Provide trainings and consultancy services.

OBJECTIVES

1. To be a leading research center in processing and technology for advanced materials and nanomaterials.
2. To produce experts in the field of processing and technology for advanced materials and nanomaterials.
3. To be a knowledge dissemination center of processing and technology for advanced materials and nanomaterials
4. To build a network of strategic partnership between local and international researchers from public and private institutions.

MPTL Research Group

Materials Processing

This program focuses on developing research related to scalable processing of advanced materials and nanomaterials. We have expertise in synthesis of carbon nanostructures such carbon nanotubes (CNT) and CNT cotton by both batch and continuous chemical vapour deposition (CVD) processes. The existing know how and facilities in CVD processing open other venues for research such as superconductor thin film and bottom-up synthesis of graphene and homologous graphene. Scalable top-down processes for preparation of graphene oxide and graphene quantum dots are also being actively pursued. Other scalable processes for synthesis of advanced materials and nanomaterials include hydrothermal and solvo thermal approaches.

Nanomaterials Technology

This program focuses on the development of innovative products using advanced materials and nanomaterials for various applications. The different types of nanomaterials used include carbon based nanostructures such as carbon nanotubes (CNT), graphene oxide and reduced graphene oxide, graphene quantum dots as well as other various types of metal oxide nanoparticles. The products being developed are diverse and include nanofluids such as nanomaterial enhanced drilling fluids and heat transfer fluids for microfluidics, nanoemulsion systems such as nanoemulsion fuels and pesticides, a wide range of nanocomposites, nanocatalysts, nanocoatings and smart materials. The nature of research under this program ranges from fundamental studies to applied research to proof of concept and performance testing.

Laboratory Members

Assoc. Prof. Dr. Suraya Abdul Rashid

Head of Laboratory
B.Eng. (Hons) (Nottingham), Ph.D. (Imperial College, London)
Expertise :
Nanotechnology and Nanomaterials

Prof. Dr. Robiah Yunus

Research Associate
B.Sc. (Alabama), M.Sc. (Leeds), Ph.D. (UPM)
Expertise :
Renewable Energy, Reaction Engineering, Process Engineering

Prof. Dr. Luqman Chuah Abdullah

Research Associate
B. Sc. (Hons) (UTM), Ph. D (Birmingham)
Expertise :
Saperation Technology, Chemical and Environmental Technology, Material Engineering (Polymer) and Particle Technology

Assoc. Prof. Dr. Nor Azowa Ibrahim

Research Associate
B.Sc. (Kansas, USA), M. Sc. (Illinois, USA), Ph. D (UPM)
Expertise:
Polymer Chemistry, Environmental Chemistry

Assoc. Prof. Dr. Mohamad Amran Mohd Salleh

Research Associate
B. Eng. Sc. (Western Ontario), Ph. D (Birmingham)
Expertise :
Particle Technology, Biochar and Nanotechnology, Carbonaceous Particulates

Dr. Dayang Radiah Awang Blak

Research Associate
B.Eng. (Hons) (CWRU), PhD (Birmingham)
Expertise :
Heat Transfer, Modelling; Food Processing; Crystallisation; Pharmaceutical Products, Nanoscale Technology

Dr. Siti Hajar Othman

Research Associate
B. Eng. (Vanderbilt), Ph. D (UPM)
Expertise :
Nanotechnology, Food Packaging Engineering

Dr. Umer Rashid

Research Fellow
B. Sc. (Lahore, Pakistan), M. Sc. Chemistry (Faisalabad, Pakistan), Ph. D (Faisalabad, Pakistan)
Expertise :
Renewable Energy (Biodiesel)

Dr. Shafreeza Sobri

Research Associate
B. Eng (Hons) (UTM), Ph. D (Newcastle)
Expertise :
Electrocrystallisation and Electrochemical Engineering

Dr. Faizah Mohd Yasin

Research Associate
B. Eng (TUT), M. Sc. (UPM), Ph. D (University of Western Australia)
Expertise :
Nanotechnology, Advanced Materials

Dr. Nordin Bin Haji Sabli

Research Associate
B. Eng (TUT), M. Eng (UPM), Ph. D (UPM)
Expertise :
Photoelectrochemical cell, Fuel Cell

Dr. Tan Tong Ling

Post Doctoral
B. Sc. (Hons) (UNIMAS), Ph.D (UM)
Expertise :
Carbon Nanomaterials Photocatalysis

Dr. Lim Bo Yuan

Post Doctoral
B. Eng. (Hons) (UM), Ph. D (UPM)
Expertise :
Agricultural Machinery Design and Development
CFD Modelling

Siti Zulaika Razali

Research Officer
B. Eng (UKM), M. Sc. (UPM)
Expertise :
Chemical Engineering (Process)

Juraina Md Yusof

Research Officer
B. Eng. (USM)
Expertise :
Electrical Electronics Engineering – Control
Robotics and Automation

Mohd Ali Mat Nong

Research Officer
B. Eng. (UPM)
Expertise :
Microelectronics

Laboratory Members

Roslina Abdul Rashid

Science Officer
B. Sc. (Hons) (UPM)
Expertise :
Materials Science, Materials Characterization

Zakky Yamanie Jamiauddin

Assistant Engineer
Certificate of Engineering (Politeknik TSM Kulim)
Expertise :
Mechanical Engineering

Ab Haffiz Ab Jalil

Assistant Engineer
Diploma in Engineering (Politeknik SSAAS)
Expertise :
Electrical and Electronics



FUNCTIONAL DEVICES LABORATORY (FDL)

Functional Devices Laboratory (FDL), formerly known as Sensor Technology Laboratory (STL) had been restructured and renamed in line with ITMA new ecosystem. The laboratory aims to be a leader in sensor technology and electron devices for nanotechnology and advanced materials. The main activities of the laboratory are conducting research in related fields, postgraduate programs, provide trainings and consultancy services.

OBJECTIVES

1. To be a leading research center in sensor technology and electron devices for advanced materials and nanomaterials.
2. To produce experts in the field of sensor technology and electron devices for advanced materials and nanomaterials.
3. To be a knowledge dissemination center of sensor technology and electron devices for advanced materials and nanomaterials.
4. To build a network of strategic partnership between local and international researchers from public and private institutions.

FDL Research Group

Sensor Technology

Sensor technology includes the study and preparation of sensing material and characterized by related transducer, signal processing and design of system or devices (including micro and nanoscale) in development of sensor to meet society and industrial demands. Sensor system includes (but not limited to) electronic sensors, biosensors, and chemical sensors. Sensor technology has a very important role as the key technology to support a wide variety of research and industrial applications. It is also a vital element that can be applicable to water security, environment and green technology.

Nanomaterials Technology

Electron Devices is a program that has been offered under this laboratory starting from 2012. This program aims to perform basic and applied research in the growth of semiconductors and related electronic materials, as well as micro analysis with the aim of developing new and improved electronic devices. The vision in this area is next generation electronic devices and sensors for improved performance and reliability in complex environments. Research areas include nanoelectronics and MEMS, RF and energy harvesting.

Laboratory Members

Assoc. Prof. Dr. Suhaidi Shafie

Head of Laboratory
B. Eng. (University of Ryukyus), M. Sc. (Tokyo University of Agriculture and Technology, Japan), Ph. D Eng. (Nanovision) (Shizuoka University, Japan)
Expertise :
CMOS Image Sensor, Porous Silicon, Solar Cell, VLSI Design, Analog TV/VCR Tuners

Prof. Dr. Nor Azah Yusof

Director of ITMA
B. Sc. (Hons), (UKM), Ph. D (UKM), Postdoctoral in Institute of Biotechnology, University of Cambridge
Expertise :
Chemical and Biosensor, Molecular Imprinted Polymer

Assoc. Prof. Dr. Mohd Nizar Hamidon

Head of Electron Devices Program
B. Sc. (Hons) (UM), M. Sc. (UKM), Ph. D (University of Southampton)
Expertise :
Microelectronics (Sensor Technology), MEMS, Devices Fabrication and Packaging, Wireless System

Prof. Ir. Dr. Mohd Zainal Abidin Abdul Khadir

Research Associate
B. Eng. (UPM), Ph. D (Manchester), P. Eng., C. Eng. (U.K), MIET, SMIEEE, MIAENG
Expertise :
Lightning Protection, High Voltage Engineering, Insulation Coordination

Prof. Dr. Norhisam Mison

Research Associate
B. Eng. (Shinshu University, Japan), M. Eng. (Shinshu University, Japan), Ph. D (Shinshu University, Japan) Japanese Language Intensive Course (UM)
Expertise :
Electrical Machine, Power Electronic Drive, Magnetic Sensor

Dr. Mohd Hanif Yaacob

Research Associate
B. Eng. (Hons) Electronic Computer System (Salford University, U.K), M. Sc. Communication and Network Engineering (UPM), Ph. D Electrical and Computer Engineering (RMIT University, Australia)
Expertise :
Electronic and Optical Communication

Dr. Shahrul Ainliah Alang Ahmad

Research Associate
B. Sc. (Hons) Industrial Chemistry (UPM), Ph.D in Physical and Analytical Chemistry (University of Sheffield), Postdoctoral in Organic Synthesis, Surface Modification and Electrochemistry (University of New South Wales)
Expertise :
Industrial Chemistry

Dr. Mohd Nazim Mokhtar

Research Associate
B. Eng (Hons) (Surrey), Ph.D (Surrey)
Expertise :
Biomedical Nanoelectronics Engineering, Lab on Chip, Energy Harvesting

Dr. Yap Wing Fen

Research Associate
B. Sc. In Physics (with education), Ph. D in Applied Optics (UPM)
Expertise :
Optical Based Sensor

Dr. Jaafar Abdullah

Research Associate
B. sc. (Hons) in Chemistry, Ph. D in Analytical Chemistry Biosensor (UKM)
Expertise :
Chemical and Biosensor

Dr. Nizam Tamchek

Research Associate
B. sc. (Kanazawa University, Japan), M. sc. (UM), Ph. D (UM)
Expertise :
Photonics

Dr. Suriati Paiman

Research Associate
B. Sc. In Industrial Physics, M. Sc. (Physics) in Thin Film Physics (UTM), Ph. D in III – V Compound Semiconductor Nanotechnology Australian National Nanotechnology
Expertise :
Compound Semiconductor Materials Science (III – V semiconductors), Compound Semiconductor Nanotechnology and Photovoltaics

Assoc. Prof. Dr. Yusran Sulaiman

Research Associate
B. Sc. (Hons) (UTM), M. Sc. (UTM), Ph. D (Durham, U.K)
Expertise :
Electroanalytical Chemistry and Materials Chemistry

Laboratory Members

Dr. Mohd Khair Hassan

Research Associate
Diploma of Electrical and Electronic Engineering (ITM), B. Eng. (Hons) Electrical and Electronic Engineering (University of Portsmouth, U.K), M. Eng. (Electrical) Major in Control System (UTM), Ph. D (Automotive Engineering (UPM)
Expertise :
Energy Engineering, Control System

Dr. Amir Reza Sadrolhosseini

Research Fellow
B. Sc. (University of Tehran), m. Sc. (Azad University), Ph. D. (UPM)
Expertise :
Nanomaterial, Plasmonic and Optical Sensor

Dr. Mohamed Husham Mohamed Ali

Post Doctoral
Ph. D Applied and Engineering Physics (USM)
Expertise :
Synthesis and Characterization of nano-structure, Semiconductor for Electronics, Optoelectronics and Biomedicine

Rosiah Osman

Research Officer
B. Sc. (The University of Southwestern Louisiana (Lafayette), M. Sc. (UPM)
Expertise :
Electrical and Electronics Engineering

Intan Helina Hasan

Research Officer
B.Sc.(Yokohama National University)
M. Sc. (UPM)
Expertise :
Smart Technology and Robotics Engineering

Md. Ali Rani

Science Officer
B. Sc. (UPM)
Expertise :
Forest Management

Mohd Wafi Azimin Muhammad Jan

Assistant Engineer
Certificate of Electronic Communication
Expertise :
Electronics Communication



FIELD OF STUDY

NANOMATERIALS

Nanomaterials exhibit novel and superior physical and chemical properties, phenomena and processes, which are different from those of bulk materials. Metal nanoparticles have been intensively studied recently due to their novel optical, electronic, magnetic and electrochemical properties. In particular, silver nanoparticles have many potential applications in optical waveguides, optical switches, molecular identification, catalysis, pronounced surface plasmon resonance absorption, surface enhanced Raman scattering and surface-enhanced fluorescence. The properties of metal nanoparticles depend on several factors such as the electron density, size and shape of the nanoparticles, dielectric constant of the medium. The group has embarked on the preparation of polymer/metal nanocomposites by reduction of g radiation, chemical and physical methods. Various characterization techniques are employed including SEM, TEM, XRD, UV-visible spectroscopy and electrical properties. Nanotechnology has become one of the most important and exciting forefront fields. Various devices in the nanoscale will be created in the near future. Demands for nanosized materials are increasing due to new inventions and innovations in nanotechnology. One of nanomaterials that have garnered the interest of researchers in the world is CNTs which deemed to change the scale of our current equipment. Based on the need of rising interests in synthesizing CNTs for nanotechnology, commercial PLAD systems and components with low start-up cost must also reached the market. We have designed an inexpensive new chamber for the pulsed laser ablation deposition (PLAD) system to synthesis carbon nanotubes (CNTs). A T-shaped steel vacuum chamber was designed which has a cylindrical shape, with diameter of about 15cm and 45cm length.

ADVANCED MATERIALS

Advanced Materials Engineering is designed to train students in the materials and processes fields, for the purpose of integrating them in high-tech and traditional technological industries or in materials research at advanced degree levels. This program aims at preparing students with in-depth multi disciplinary knowledge, current issues and practices in the field of Advanced Materials such as composite, ceramic, electronic materials, magnetic material, smart material, plastic and polymer.

GREEN ENGINEERING

Green Engineering is the process and design of products that conserve natural resources, and impact the natural environment as little as possible. The term is often applied to system or device that requires engineering, and incorporates sound environment principles. Though green engineering is somewhat more expensive, many countries, recognizing the value of such work, have begun to offer tax breaks, and other incentives to those who incorporate its use.

NANOTECHNOLOGY

This program aims at preparing students with knowledge related to Nanotechnology which deals with developing materials, devices, or other structures possessing at least one dimension sized from 1 to 100 nanometres. Nanotechnology is the study of manipulating matter on an atomic and molecular scale. Nanotechnology entails the application of fields of science as diverse as surface science, organic chemistry, molecular biology, semiconductor physics, microfabrication. Some of typical applications of nanotechnology are in sensor, in delivery system, nanoabsorbents, nano electronic, nano machine, nanocomposites, nanotubes, and nanocarbons.

ENERGY

The field of energy engineering covers both fundamental and applied research that involves development, design and usage of alternative energy, renewable energy and sustainable technology. Renewable energy covers solar, wind, hydro, tidal, biomass and hydrogen energies. Research areas for renewable energy covers machine development, instrumentation, energy generation, energy storage that are environmentally friendly. For development of solar energy system, its instrumentation covers solar tracking device, modification of stirling engine, water drainage system, solar mirrors and smooth operation for the energy generation for a solar bowl. Wind farm requires a generation system, energy distribution and energy storage facilities.

Development of gasifier and purification of synthesis gas for generation of electrical energy direct from oil palm biomass and generation of gases from biomass and some aspects of biomass energy generation. Animal tracking system and development of automatic methane gas generation are challenges for this research. Development of smart window, smart chimney and use of photo voltaic in creating a healthy indoor environment are part of sustainable technology. Students are required to take courses in related fields as stated and to conduct research as well as presenting research results in seminars.

SENSOR TECHNOLOGY

Sensor Technology Engineering is the design and development of sensors to meet the need of the growth in products and services that utilize information from different types of sensors. Sensor technology has a very important role as the key technology to support a wide variety of research and industrial application. It is also a vital element that can be applicable in agriculture, water security, environment and green technology. The term is applied mostly in development of sensor networks, which also include wireless sensor networks (WSN). Although sensors can include electronic sensors, biosensors, and chemical sensors, the focus will be on the development and design of the electronic sensors.

POST GRADUATES

Number of Ph.D Students ini 2017

PROGRAM	NATIONALITY	NO. OF STUDENTS
Ph.D	Malaysia	64
	Iran	10
	Iraq	6
	Nigeria	5
	China	1
TOTAL		86

Number of Master Students in 2017

PROGRAM	NATIONALITY	NO. OF STUDENTS
Master	Malaysia	53
	Iran	1
	Iraq	2
	Nigeria	3
	Yemen	1
TOTAL		60



Posgraduate KPI Achievement in 2017

LINKAGES & NETWORKING



DELEGATES FROM THE NATIONAL SCIENCE CONSORTIUM, PHILIPPINES

March 30, 2017 – ITMA received delegates from the National Science Consortium – Science Education Institute, Philippine. A group of nine people were led by Dr. Mark Rolan Confessor, The Dean & Project Leader of Mindanao State University-Iligan Institute of Technology (MSU-IIT). Visitors were greeted by the Director of ITMA Prof. Dr. Nor Azah Yusof and researchers from ITMA.

During the visit they were briefed on ITMA's history, background and achievements. They were also informed on facilities and services

provided by ITMA. A short discussion took place to open up new networking opportunities and exchanging of ideas between the two parties on potential collaboration.

In the final session, visitors toured ITMA's laboratories including the Field Emission Scanning Electron Microscope (FESEM). They were very excited after seeing the high technology facilities and services in ITMA. The visit ended at 2 pm before they continued their visit to the Faculty of Science.

CONTINENTAL TYRE (M) SDN. BHD VISIT TO INSTITUTE OF ADVANCED TECHNOLOGY

Continental Tyre (M) Sdn. Bhd Visit to Institute of Advanced Technology, UPM

June 8, 2017 - Material Processing and Technology Lab (MPTL) received visitors from Continental (M) Sdn. Bhd., a tyre manufacturer company based in Petaling Jaya, Selangor. They were represented by Group Leader, Ms. Chai Fei Chin and Senior Chemist, Ms. Jannah Jaafar Sidek of Material and Simulative Evaluation Department. They were welcomed by Assoc. Prof. Dr. Suraya Abdul Rashid as the Head of MPTL, Research Officers, Mohd Ali Mat Nong and Juraina Md Yusof and Science Officer, Roslina Abdul Rashid. During the meeting which was held at ITMA Seminar Room, each party introduced each other on their nature of business and current research and development areas they are working on. A brief discussion on future collaboration in related areas between researchers in ITMA and Continental was brought up which was a good start for academia-industry linkages initiative. Finally, the visitors were led by Assoc. Prof. Dr. Suraya Abdul Rashid to a visit MPTL's laboratory, and several other laboratories in ITMA that housed cutting edged equipment such as Field Emission Scanning Electron Microscope (FESEM) and Raman Spectroscopy.

Continental Tyre (M) Sdn. Bhd 2nd Visit to Institute of Advanced Technology, UPM

Material Processing and Technology Lab (MPTL) received a second visit from Continental (M) Sdn. Bhd., a succession from the last academia-industrial meeting which took place also at ITMA's Meeting Room on 17th July 2017. This time, Continental was led by General Manager, Mr. Jonathan Lim Shiang Chin, Human Relations Manager, Ms Lei A. Datuin, Ms. Candice Ng Wen Wei, Ms. Jannah Jaafar Sidek and Ms. Chai Fei Chin. Meanwhile, MPTL were represented by Assoc. Prof. Dr. Suraya Abdul Rashid as the Head of Lab, Assoc. Prof. Dr. Mohammad Amran Mohd Salleh as Head of Chemical and Environmental Engineering Department (KKA), Faculty of Engineering together with MPTL's Research Officers. A proper introduction and presentation on each other business were held followed by a motion to include KKA in this particular research partnership. The meeting moved a step further by discussing in depth on the potential areas of collaboration, scope of memorandum of understanding and student/trainee exchange. Overall, MPTL and Continental had come to a term in drafting a suitable MoU to realize their collaborations in research and development that might benefit both parties accordingly. The delegations were brought to the Faculty of Engineering to visit the cutting edge facilities in KKA laboratories.



PLAQUE PRESENTATION CEREMONY FOR SATELLITE OFFICE OF SHINSHU UNIVERSITY 2017

July 24, 2017 – The Plaque Presentation Ceremony was held at the Putra Gallery, Chancellery Building, Universiti Putra Malaysia (UPM). The ceremony was held as symbolic for the placement of Shinshu University Satellite Office at the Institute of Advanced Technology (ITMA), UPM.

This event was attended by the representatives from both universities. UPM were represented by the Vice Chancellor, Prof. Datin Paduka Dr. Aini accompanied by Assoc. Prof. Dr. Mohd. Nizar Hamidon (ITMA Deputy Director), Prof. Dr. Norhisam Misrom (the project leader) and the other ITMA management members.

Meanwhile, representatives from Shinshu University were Prof. Dr. Kiyoshi TANAKA, the Vice President (International Affair), Hirokazu NAGATA, Michiko NISHIKAWA, the second Secretary of Agriculture, Forestry, Fisheries & Environment, Japanese Embassy in Malaysia and Mizutani, the Managing Director of Fujitsu Communication Malaysia.

The Satellite Office serves as Shinshu University office in UPM and aims to further enhance international academic exchange activities inclusive of the student and staff mobility program inter-universities. The establishment of this Satellite Office is a step forward to open up more opportunities for international collaborative research and education program in the future.



MPTL's Visit to Continental Tyre (M) Sdn. Bhd

August 28, 2017 - The academia-industries linkage ties between Material Processing and Technology Lab (MPTL) and Continental Tyre (M) Sdn. Bhd. was elongated further with MPTL's team paying a research visit to Continental factory at Petaling Jaya on 28 August 2017. MPTL's team was led by Assoc. Prof. Dr. Suraya Abdul Rashid together with Prof. Dr. Mohd Zobir Hussein, Assoc. Prof. Dr. Mohammad Amran Mohd Salleh, Dr. Ismayadi Ismail, Mohd Ali Mat Nong, Juraina Md Yusof and Roslina Abdul Rashid. Meanwhile Continental was represented by Chai Fei Chin, Tang Hon Peng, Jannah Jaafar Sidek, Choong Lap Kit, Addy Chee Wei Kit and Ku Suhasliza Ku Sulong.

The meeting started with a brief introduction by everyone present followed by the agenda of the day. Ms. Chai Fei Chin started with the objectives and expectations of Continental on this collaboration followed by a presentation by Assoc. Prof. Dr. Suraya stating MPTL's objectives and expectations. Continental's expectations include knowledge exchanges, sharing and support in research and development, allotment of testing facilities and student exchange.

Continental's briefly laid out their process in research for raw natural rubber from characterization to stabilization and functionality test. Some of their problems were also shared regarding the isolation of protein and lipids in natural rubber, addition of silica to enhance mechanical strength and their interest to embed conductive materials in natural rubber as a sensor or energy harvesting device. The need to control swelling behavior for stabilization of raw natural rubber was also discussed.

MPTL's expectations includes having a close academia-industry linkages in terms two way student exchanges involving practical students from UPM as Continentals trainee, and accepting Continentals students to further studies in UPM (in general). MPTL's research

expectations include collaboratively applying for high impact research grants and sharing of facilities and expertise for both parties.

It was later followed by a presentation by Prof. Dr. Mohd Zobir Hussein on Inorganic based phytohormone delivery vector of 2-chloroethylphosphonate nanohybrid, a new stimulating compound with controlled release property to increase latex production. The primary expected outcomes from this joint research are an establish study on stabilization, crosslinking and swelling behavior of NR. The last agenda concluded some actions to be taken by respective parties after the meeting. MPTL will have to check with respective researchers for their journals and replied the open questions from Conti on the related research work. In addition, MPTL planned to call interested researchers to join in the next meeting with Continentals. The MoU draft will be prepared as UPM templates by Continental side. Both parties will have further discussion on arrangement of equipment usage for the researcher.

After the meeting, MPTL's delegation was brought to visit Continentals testing site and lunch at the cafeteria. In conclusion, the visit to Continental Tyre (M) Sdn. Bhd was a fruitful networking session with promising outcomes for a tight collaboration between ITMA and Continental.



VISIT FROM DELIGATES OF ATATURK UNIVERSITY, TURKEY



October 3, 2017 - Institute of Advanced Technology (ITMA) received a visit from Ataturk University, Turkey. The purpose of the visit was to provide a framework to collaborate on a program of study led by the Graduate School of Studies, Universiti Putra Malaysia.

The visit was held from October 3, 2017 until October 4, 2017 and was attended by Prof. Dr. Ömer ÇOMAKLI (Rector), Dr. Bulent Cavusoglu (Executive Director Office of International Affairs), Prof. Dr. Mehmet Ertugrul dan Prof. Ali Çağlar Güllüce (Rector's Special Officer).

This delegation was taken to several faculties and other places in UPM. Among the places visited were Faculty of Veterinary Medicine, Faculty of Engineering, Faculty of Agriculture, School of Graduate Studies and UPM Agricultural Park. Hopefully, this visit will further strengthen the relationship between UPM and overseas universities such as Ataturk University. ITMA will also continue the research collaboration by sending students from ITMA for mobility program as well as to finding other research opportunities at Ataturk University.



VISIT FROM SHINSHU UNIVERSITY, JAPAN



December 7, 2017 - Institute of Advanced Technology (ITMA) has received a delegation visit from Shinshu University, Japan. The purpose of the visit was in conjunction with a research collaboration that was long concluded between Universiti Putra Malaysia and Shinshu University as well as the "Seminar on Engineering and Agriculture" organized by the ITMA.

The visit was held on 7 December 2017 and was attended by 7 professors from Shinshu University and led by Prof. Dr. Kiyoshi Tanaka the Deputy President of Shinshu University (Internationalization). On the first day they were brought to the Faculty of Engineering UPM as well as the Faculty of Agriculture UPM to discuss future collaboration in Agriculture Engineering. The following day on 8 December 2017 they were brought to the places of interest in UPM, among them were UPM Malay Heritage Museum, UPM-Kyutech Pilot Plant Biorefinery @ UPM and Deer Farm at UPM Agricultural Park. It is hoped that this visit will further to strengthen the relationship between UPM and overseas universities such as Shinshu University.

It is hoped that with the Shinshu University Satellite Office officially stationed at ITMA on July 24, 2017, it will enhance the opportunities for staff and students from ITMA to look for other research opportunities at Shinshu University.



FACILITIES

ITMA provides testing services using a variety of equipment to meet the needs of research, especially in the areas of advanced materials and nanotechnology. Testing and fabrication services offered are as follows:

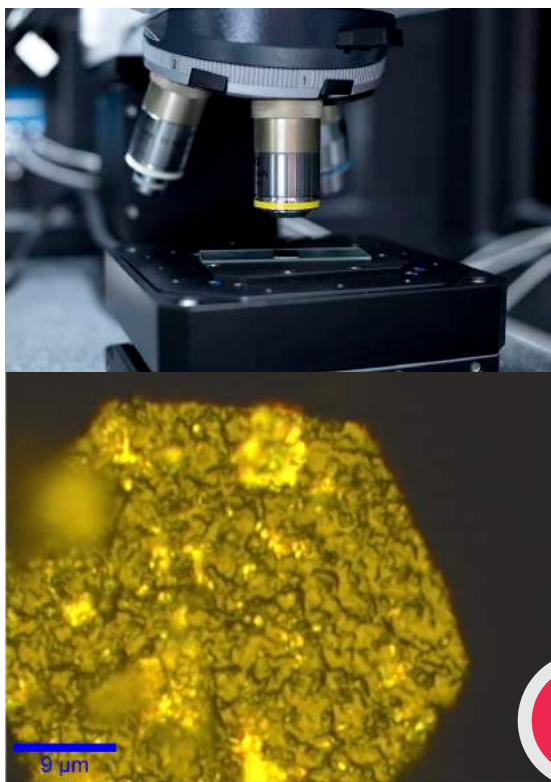
1. Molecular analysis
2. Thermal analysis
3. Particulate size analysis
4. Porosity testing
5. Mechanical testing
6. Chromatography testing
7. Magnetic characterization
8. Printed circuit board (PCB) fabrication



NOVA NANOSEM 230 FESEM

Ultra high Resolution Scanning Electron Microscope (FESEM) with Energy Dispersive X-Ray (EDX).

This electron microscope is able to produce enlarged images of a variety of specimen, achieving magnifications of over 500,000x and providing ultra-high resolution imaging in a digital format.



ALPHA 300R RAMAN SPECTROSCOPY

This spectroscopy is able to determine the chemical structure of samples and identify the compounds present by measuring molecular vibrations.

Available laser excitations are 488nm, 532nm, 633nm. There are several types of analysis such as single spectrum, mapping and line scanning.



UP PLUS 2 3D PRINTER

Precision Output : 10 microns – 50 microns

"Z" Thickness Resolution :

150 microns – 400 microns

Support Material : Smart Break-away support automatically generated by 3D Printer.

For those who need the analysis services using the above equipment, please fill the application form from Institute of Advanced Technology (ITMA) website and send to :

Email : itma_analysis@upm.edu.my

Fax : 03-89467006

Website : www.itma.upm.edu.my

HUMAN RESOURCES



POSTS IN ITMA

In 2017, ITMA had 45 staff; 13 from academic position and 32 from non-academic position.



Overall Total Staff by Grade in 2017

Position	Grade	Status		
		Permanent	Contract	Total
Associate Professor	DS54	5	-	5
Research Fellow	UDQ10 UDQ8 UDQ5	-	1 1 1	3
Post Doctoral	UPD10-1 UPD9-1	-	4 1	5
Management Officer	N44 N41	1	1	2
Publication Officer	N41	-	1	1
Research Officer	Q52 Q48 Q43 / Q44	1 1 5	-	7
Science Officer	C44 C41	3	1	4
Assistant Engineer	J29	6	-	6
Secretary	N28 N27	1 1	-	2
Administrative Assistant	N22 N19	4 1	2	7
Operation Assistant	N14 N11	1 1	-	2
Driver	R3	1	-	1
Total		33	13	45

UPM EXCELLENCE SERVICES AWARD (MAJLIS GEMILANG PUTRA)

25 May, 2017 - Each year, UPM will hold a ceremony to recognize employees who demonstrate a standard of excellence in work and provide a significant contribution to Universiti Putra Malaysia. The award announcement was made in May, 25th 2017 and was formally acknowledged at the Gemilang Putra 2017 event and Workers Day 2017 celebration.

Two of ITMA's staff were selected to receive the Anugerah Perkhidmatan Cemerlang (Excellent Service Award) for year 2016. A heartfelt congratulations to the recipients and may this reward further motivate ITMA's staff to consistently excel in their positions and demonstrate integrity and a strong commitment to the mission and values of the institution.

APC 2017 RECIPIENT



Dr. Ismayadi Ismail - Research Officer



Noor Lina Shamsudin - Assistant Engineer



LIST OF COMMITTEES

ITMA PUBLICATION & WEBSITE COMMITTEE

Introduction

During the year 2017, ITMA's Publication & Website Committee managed to publish Nanoscope 2016 which has been distributed to all faculties, institute and relevant centers of UPM. It is also given to visitors who visit our institute.

Committee Members

ITMA Main Publication & Website Committee

Chairman : Assoc. Prof. Dr. Suraya Abdul Rashid

Secretary : Muhamad Zuhairi Bin Zainul Abidin

Members :

News – Intan Helina Hassan

Annual Report – Marzieana Ab Rahman

Laboratory Reports Unit – Research Officer

Publicity / ITMA Brochure – Marzieana Ab Rahman

Webmaster – Marzieana Ab Rahman

Publication Unit – Marzieana Ab Rahman

Cameraman – Muhamad Zuhairi Zainul Abidin

Activities

- a. Publication of Nanoscope 2016.
- b. Design brochure for MSCL, MPTL & FDL programs and activities.
- c. Design and print banners, bunting & posters for programs organized by ITMA.
- d. ITMA Publication & Website Committee has received 4 stars rating of website management assesment and updated facebook page and Instagram as a communication channel so that the sharing of information can be made through the website and other social media effectively.

OCCUPATIONAL SAFETY AND HEALTH COMMITTEE

Introduction

ITMA's Occupational Safety and Health Committee (OSHC) was established for the following purposes:-

1. To ensure that ITMA complies with Occupational Safety and Health ACT 1994 (Act 514), the Atomic Energy Licensing Act 1984 (Act 304) and other related act and regulations.
2. To carry out the internal inspection and be ready for occupational safety and health audit from UPM Occupational Safety and Health Office.
3. To carry out the investigations and accident studies, hazardous incident, occupational poisoning and diseases.
4. To plan, prepare and implement appropriate training programs on occupational safety and health.
5. To be responsible for any related matters on safety and health in ITMA and issue the directive thereon.

Committee Members

Chairman :	Assoc. Prof. Dr. Abdul Halim Abdullah
Deputy Chairman :	Md. Ali Rani
Secretary :	Noor Lina Shamsuddin

Employer representative

Md. Ali Rani
 Sarinawani Abdul Ghani
 Roslina Abdul Rashid
 Nurnazeera Zulkefli
 Marzieana Ab Rahman
 Nazrul Abdullah

Employee representative

Ab Haffiz Ab Jalil
 Mohd Wafi Azimin Mohammad Jan
 Mohd Kadri Masaud
 Zakky Yamanie Jamiauddin
 Noor Lina Shamsuddin
 Zamzurina Abdul Wahab

Activities

During 2017, ITMA OSHC has conducted several activities as follows:

Event : Workplace Audit by UPM OSH Team
 Date : 28 August 2017

Event : Fire Drill Talk by UPM OSH Team
 Date : 20 May 2017

Event : Fire Drill
 Date : 12 July 2017

POSTGRADUATE CO-ORDINATOR

Introduction

The postgraduate coordinator's role is to monitor and complete the required candidature milestones (such as the core component of the structured program and annual review of progress) on time. Another role is to provide our students important sources of their study such as 24-hour access to student room and internet hotspot. We also help to provide useful sources of information from all around the world to our students to help them in their research or career advice.

The director of ITMA has the ultimate responsibility for quality of supervision and the provision of resources for all postgraduate programs by research students within the institute. Our prospective students will be informed about the development components of the structured program offers the opportunity to acquire generic skills that may increase the employability, quality of research, high-impact publication and certificates will be awarded for any participation in training and courses.

Postgraduate Coordinator Members

Deputy Director : Assoc.	Prof. Dr. Abdul Halim Abdullah
Administrative Officer :	Norizanne Abd Rahim
Administrative Assistant :	Rokiah Deraman

Student Mobility (Inbound)

- a. Institution : Shinshu University, Japan
Date : 27.02.2017 – 03.03.2018=7
Name :
 1. Sugimura
 2. Miyazaki
 3. Senga
 4. Koh
 5. Takada
 6. Yokokawa
- b. Institution :
Kyushu Technology University, Japan
Date : 08.10.2017 – 20.10.2017
Name :
 1. Tomoki Mori
 2. Syoutarou Kiyomatsu
 3. Yoshiaki Kubutsu
 4. Takuma Sasaki
 5. Shidan Zhang
 6. Yukimasa Nakatsuru
 7. Mutsuki Hino
 8. Masaki Yamamoto

- d. Institution :
Prince Songkhla University, Thailand
Date : 08.11.2017 – 07.11.2017
Name :
 1. Prichet Ketsamee

Student Mobility (Outbound)

- a. Institution :
Shinshu University, Nagano, Japan
Kyutech, Tobata Campus, Japan
Date : 12.12.2017 – 20.12.2017
Name :
 1. Noor Diana Nordin
 2. Norhidayah Azeman
 3. Samaila Buda
 4. Suhainie Ismail
 5. Nazifah Ariffin
 6. Intan Helina Hasan
- Event : Fire Drill
Date : 12 July 2017

- c. Institution :
Kyushu Technology University, Japan
Date : 12.11.2017 – 24.12.2017
Name :
 1. Yui Ishizaki
 2. Daiki Sakaguchi
 3. Hideaki Furuki

LABORATORY ACTIVITIES

WORKSHOP ON SURFACE AREA & PARTICLE SIZE DISTRIBUTION (SAPSID 2017) WORKSHOP

January 10, 2017 - Institute of Advanced Technology (ITMA) organized a Workshop On Surface Area & Particle Size Distribution SAPSiD 2017. This workshop was aimed to provide exposure on the basic concept of surface area and size particle size distribution for porous and non-porous nanomaterials. A total of 40 participants from various faculties and institutes from within and outside UPM participated in this workshop.

Measurement of surface area and size of particle size distribution are two of the most important physical properties for advanced characterization and nanomaterial. These techniques provide important information on material features, which are important

for a wide variety of applications. The data generated from this technique can be used to support other data obtained by other technologies.

The workshop session started with a theoretical session presented by Professor Dr. Mohd. Zobir bin Hussein who is a Fellow researcher at ITMA. In the afternoon, demonstration sessions were held at ITMA labs. The demonstration session was taken over by assistant engineers and ITMA student representatives. This program has been successfully organized and is expected to benefiting to researchers and graduate students who participate in the program.



HIDEN ANALYTICAL SEMINAR – MASS SPECTROMETER

February 15, 2017- MPTL organized a seminar on mass spectroscopy analytical tool which was held at MLA Room, ITMA. The seminar was attended by 20 people and which was facilitated by Mr. Colin Robert, Sales Director at Hiden Analytical Limited, United Kingdom. He has a vast experience in instrumentation for 17 years and his specialization was in mass spectroscopy. The seminar agenda comprised of an introduction to Hiden Analytical business and its products briefing.

It was followed by an explanation on 3 types of mass spectrometers currently in the market by Hiden Analytical which comprised of mass spectrometer for gas analysis, mass spectrometers for catalysis and thermal analysis and mass spectrometers for thin films, plasma and surface engineering. The half day seminar was co-sponsored by QC Scientific (M) Sdn. Bhd. as the company partner for Hiden Analytical in Malaysia market. It is hoped that such seminar with the involvement of private companies will trigger a comprehensive networking between academia and industries.



UPM-KYUTECH JOINT SEMINAR ON SOLAR TECHNOLOGY 2017

March 9, 2017 – Functional Devices Laboratory (FDL) organized the UPM-Kyutech Joint Seminar on Solar Technology 2017. A total of 70 participants attended this program. There were 10 presenters who attended this program to share about their ongoing research and ideas on Solar Technology.

Among presenters who participated were Prof. Shuzi Hayase, Prof. Tingli Ma, Assoc. Prof. Dr. Shyam S. Pandey and Dr. Theresa S. Ripolles from Kyutech Japan. Assoc. Prof. Dr. Suhaidi Shafie, Assoc. Prof. Dr. Mohd Amran

Mohd Radzi, Prof. Ir. Dr. Mohd Zainal Abidin Ab Kadir and Assoc. Prof. Dr. Wan Zuha Wan Hasan from UPM. While Assoc. Prof. Dr. Nattha Jindapetch and Dr. Warit Wichakool were both from Prince of Songkhla University, Thailand.

The organizing of such programs is expected to trigger more brilliant ideas from researchers from UPM, Kyutech as well as Prince of Songkhla University for expanding research in this field as well as to realize the vision of the institute as a world-class institution.



GAS CHROMATOGRAPHY WORKSHOP 2.0 WORKSHOP



May 3, 2017 – Material Processing and Technology Laboratory (MPTL), Institute of Advanced Technology (ITMA) organized the Gas Chromatography (GC) Workshop 2.0. This workshop was meant for sharing the knowledge and expertise on ITMA facilities to UPM communities especially.

The morning session was dedicated to the talk by Dr. Umer Rashid, ITMA's Research Fellow who has over 10 years of experience in Gas Chromatography. The talk's content was about basic understanding on the Chromatography, the principle of the separation techniques, operation of GC and GC/MS and the data interpretations. The talk ended with the Q&A session.

In the evening, all participants were brought to laboratories for the demonstration sessions. They were separated into two groups for two demonstrations on Liquid Sample Testing (GC-FID) and Gas Sample Testing (Online GC). The participants were shown on how the GC system operates and were given tips on running the testing. At the end of the sessions all delegates came together for a discussion and sharing of experiences.

About 23 participants attended this workshop involving students and staff from several faculties and institution in UPM and 1 participant from MARDI. The workshop was concluded with giving out certificates to all participants.

Q1 JOURNAL WRITING WORKSHOP: SCIENTIFIC SIGNIFICANCE: THE KEY TO GET NOTICED

May 23-24, 2017 - MPTL organized a Q1 Journal Writing Workshop with the theme Scientific Significance: The Key to Get Noticed. The workshop was held at Seminar Room, UPM Golf Club and was attended by 30 participants which included students and research officers from ITMA. On the first day of the workshop, the session started with a talk by Professor Dr. Luqman Chuah Abdullah delivering his talk entitled How to Publish a World Class Paper: Part 1 and Part 2 before lunch time. The afternoon session was anchored by Assoc. Prof. Dr. Suraya Abdul Rashid as the speaker, delivering her speech on The Post-Review Process: Response and Rebuttals with question and answers session at the end of the

session. After her talk, the participants were given the time to start writing their manuscript facilitated by Dr. Suraya for any advices and guidance.

On the second day, the workshop started with a talk on How to Write a Review Paper delivered by ITMA's Research Fellow, Dr. Umer Rashid. Among of his points included the writing techniques and strategies that can be adapted to produce a high quality manuscript up to the standard to be published in Q1 journal. The remaining sessions was allocated for participants to continue their manuscript writings and the writing workshop ended with a certificates giving ceremony.



SYMPOSIUM ON ADVANCED MATERIALS AND NANOTECHNOLOGY 2017 (SAMN2017)

July 18, 2017 – Institute of Advanced Technology (ITMA) organized the Symposium on Advanced Materials and Nanotechnology (SAMN2017). This symposium was jointly organized by the Institute of Advanced Technology (ITMA) and the IEEE Circuits and Systems Society (CAS) Malaysia Chapter and was conducted for two days. The Symposium on Advanced Materials and Nanotechnology, formerly known as Workshop on Advanced Materials and Nanotechnology (WAMN) is one of ITMA's annual activities which was initiated since 2003.

This program is one of the efforts to promote and strengthen ITMA as the institute of excellence in research focusing on advanced materials and nanotechnology. Through the organization of this workshop ITMA has managed to bring together local and foreign experts to share knowledge and results of

their latest research. SAMN 2017 has attracted over 60 participants from academia, industry, and government.

The program began formally on Tuesday and consisted of 1 keynote talk, 4 plenary talks, 8 invited talks and more than 40 oral papers. These included streams on nanomaterials, nanostructured functional devices, nanoelectronics, sensors and actuators, nano energy, synthesis & characterization of functional, modeling & simulations of nano devices, photonics & optoelectronics materials, bio sensors & bio electronics and thin films. The presented papers will be peer-reviewed for publication in the International Journal of the Institute of Materials Malaysia (IJIMM), SAMN2017 Special Issue in the Journal of Solid State Science and Technology, and PERTANIKA Journal.



2017 IEEE REGIONAL SYMPOSIUM ON MICRO AND NANOELECTRONICS (RSM2017)



August 23, 2017 - The IEEE Electron Devices Society Malaysia Chapter organized the IEEE Regional Symposium on Micro and Nanoelectronics (RSM2017) at the Golden Sands Resort by Shangri La, Batu Feringgi, Penang, Malaysia from 23-24th August 2017. The conference was technically sponsored by IEEE Electron Devices Society and IEEE Malaysia Section and was co-organized by the Institute of Advanced Technology, Universiti Putra Malaysia (UPM) and Universiti Sains Malaysia.

A total of 66 papers were presented and more than 85 participants attended the symposium. This year, EDS Malaysia and RSM2017 committee offered the inaugural Student Travel Grants to selected IEEE EDS student members to attend the conference. Academics and industry personnel gave invited talks to impart their knowledge and experience to participants. Best Student Paper Awards as well as Best Student Presenter Awards were also given away to selected participants.

RESEARCH TALK ON “OLYMPUS LEXT OLS 4100 – LASER SCANNING DIGITAL MICROSCOPE”

September 19, 2017 – Functional Devices Laboratory (FDL), ITMA in collaboration with Crest NanoSolutions (M) Sdn Bhd organized a research talk on Olympus LEXT OLS 4100 - Laser Scanning Digital Microscope to share the laser profilometer's applications in materials research. The talk started at 10.00 a.m. with presentation by Mr. Ahmad Rafiqan bin Nayan, application engineer from CREST. After the talk and some refreshments provided, participants were given demonstration on the performance

of the equipment. In the afternoon session, participants were given the opportunity to witness their sample being analyzed using the laser scanning digital microscope.

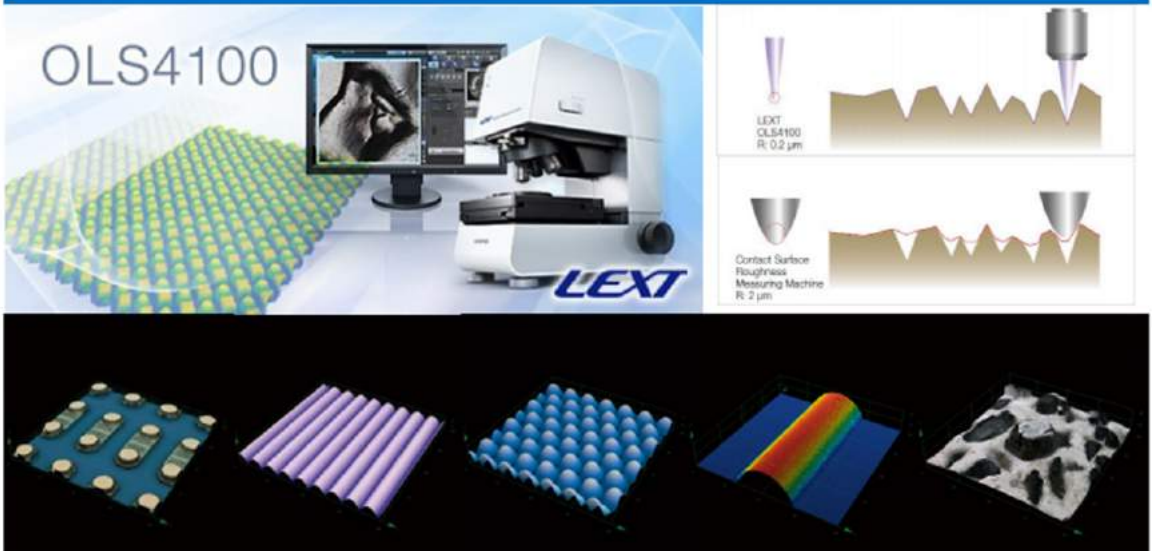
The demonstration ended at about 4 p.m. and all participants were presented with certificate of attendance from CREST. It is hoped that the equipment can be a useful research equipment in materials thickness measurement for UPM.

Research Talk

OLYMPUS



Olympus LEXT OLS 4100 - Laser Scanning Digital Microscope



TECHNICAL TALK BY DR. ALAN L. HARVEY (IEEE CAS VICTORIAN CHAPTER CHAIR)



October 12, 2017 - Functional Devices Laboratory (FDL), ITMA in collaboration with IEEE Circuits and Systems Society Malaysia Chapter co-organized a technical talk by Dr. Alan L. Harvey, who is also IEEE CAS Victorian Chapter Chair. Dr. Alan presented two talks, which are entitled "Sensor Energy Supply Systems and Aspects of Sensor Network Communication", and another talk on "How and Why to be a Consulting Engineer". A total of 20 participants from UPM as well as other agencies attended the talk.

Dr. Harvey worked on sensors for magnetic bearings for some five years at Turbo research in Melbourne. Also he has worked on sensors

for position detection and transmission of that data. Dr Harvey is the principal of Acupak a medical equipment company and an associate of Covey Consulting, a process engineering company. Recently he completed Instrumentation for process control systems for a thermal desalination plant and consults on design of a portable version. He worked for BP Australia and BP UK as a Control and Electronic Engineer. He had a PhD from Latrobe University and an MSc from UMIST UK and diplomas in Communications Engineering and Chemical Engineering.

ITMA ACTIVITIES

WORKSHOP ON DYE-SENSITIZED SOLAR CELLS WORKSHOPS & HANDS ON TRAINING (DSSC)

February 27, 2017 - Institute of Advanced Technology, Universiti Putra Malaysia, organized the Workshop on 'Dye-Sensitized Solar Cells Workshops & Hands On Training (DSSC). The program was organized by Functional Devices Laboratory Institute of Advanced Technology (ITMA).

The program was supervised by Assoc. Prof. Dr. Suhaidi Shafie and attended by 12 participants who were divided into two groups. Activities of each group was held on 27 February 2017 until 3 March 2017 for the first group and 8 October 2017 until 20 October 2017. The participants consisted of 6 students from Shinshu University Japan, 5 from Kyushu Institute of Technology (Kyutech), while another one were from Prince of Songkhla University, Thailand.

These programs were the third series after the DSSC Workshop held in 2016. Among the contents of the program were activities that included laboratory experiments for the development of solar cells by using flowers and local fruits. The participants also had the opportunity to visit UPM's Malay Heritage Museum and UPM Edu Park Dear Farm. The purpose of this visit was to introduce the Malay culture and UPM edupark to the participants, especially participants from abroad.



SCIENCE IS FUN CAMP 2017

April 22, 2017 – Institute of Advanced Technology (ITMA) organized a program called Science is Fun Camp. The program was attended by 44 students from Sekolah Kebangsaan Serdang and Sekolah Rendah Kebangsaan Seri Serdang, Selangor. The program has been implemented with the involvement of ITMA staff and students acting as a facilitator in this program.

The main objective of the program was to nurture the students interest in science and technology. The program was divided into five sessions. The first session was called "Early Science Discovery" where students were introduced to the scientists who pioneered the field of science and technology. Next, the students were given a chance to produce a jet through the session "Let it fly up to the sky". The purpose of this session was to test the students efficiency to ensure their created jet will be able to fly far and high according to the scientific concept of flight.

At the third session, the students were introduced to the microscope through session called "Let's see how it looks!". In this session, students will be able to identify the types of cells with the guidance of facilitators who were also the students of ITMA. The students were very excited to see the microorganisms that is visible to the naked eye. The program continued with the experimental activity on producing soap using paper through the activity named "Let's make bubbles". This activity was hoped to nurture the students in the aspect of hygiene. This activity can also

nurture the students to ensure hygiene aspect is very important in daily routine.

Finally, the students were tested through polystyrene cup stacking activity, named "How high can you stack?". Students who are able to develop the highest polystyrene cup won. This activity involved the gravitational effects on the stability of the cup structure and how the students can ensure the stability of the cup stacks structure.

Overall, the students were very excited and satisfied with the activities. The program concluded with the presentation of certificates and a photo session. It is hoped that more programs like this can be organized in the future.



FAMILY DAY ITMA 2017

May 20, 2017 - ITMA's Family Day 2017 was held at Primaland Resort & Convention Centre Port Dickson, Negeri Sembilan. The program was organized by Kelab Kebajikan dan Sosial (KKS) Institute of Advanced Technology (ITMA).

This program was officiated by the Deputy Director of ITMA Associate Professor Dr. Mohd Nizar Hamidon. The total number of participants were 80 persons, comprising of 17 families. The aim of this get together was to provide opportunity for ITMA families to socialize and part of this effort included games for children and adults which was organized by the committee.

In the evening, a dinner with the family of ITMA staff was held at a seafood restaurant in Port Dickson. The purpose of this casual dinner was to strengthen the relationship between ITMA's family members. We all look forward to more programs like this in the future.



AMAN PALESTIN TALK

Jun 14, 2017 – Institute of Advanced Technology (ITMA) organized a program called Aman Palestin Talk which was attended by the Ambassador of Malaysia Aman Palestin, Miss Farrah Adeeba Ashraf. Also present were Imam Ahmad Omar Khairy Taqteh who is also a Palestinian along with his translator Mr. Mukram Hj. Mohd. Taib. The program was attended by staffs of ITMA and Faculty of Engineering University Putra Malaysia. The main purpose of this talk was to spread awareness about the fate of Muslims in Palestine as well as in Syria.

The first talk started with the recital of Ayah from the Holy Quran which was recited by Imam Ahmad Omar Khairy Taqteh. Later, Mr. Mukram Hj. Mohd. Taib delivered the gratitude on behalf of the Palestinians towards the aid that had been donated by Malaysian.

At the next session the talk was given by Farrah Adeeba as the spokesperson for Aman Palestin Malaysia. She began the session by telling her experiences during a visit to Palestine. Afterwards, she also presented the information about the illegal Israelian occupation of Palestine. She begged all Malaysians to pray for the safety of Palestinians who have been oppressed by Israel terrorism. It is hoped that the existence of programs like this may deliver awareness to us and will increase our concern with the fate of the countries that have been suppressed. Finally the talk concluded with the token of appreciation giving ceremony that was presented by Associate Prof. Dr. Mohd. Nizar Hamidon.



2017 PICTORIAL

SEMINAR HIDDEN ANALYTICAL PRODUCT 14 FEBRUARI 2017



ROAD TOUR BY DEPUTY VICE CHANCELLOR (INDUSTRY AND COMMUNITY RELATIONS) PROF. DATO' DR.-ING. IR. RENUGANTH VARATHARAJOO 6 MARCH 2017



SCIENCE IS FUN CAMP 22 APRIL 2017



GAS CHROMATOGRAPHY WORKSHOP

2 MAY 2017



MPTL JOURNAL WRITING WORKSHOP

22 MAY 2017



SEMINAR BY DR.SURAYA

5 JUNE 2017



AMAN PALESTIN TALK

14 JUNE 2017



FAREWELL OF PROF. DR. NOR AZAH YUSOF 26 JUNE 2017



SYMPOSIUM ON ADVANCED MATERIALS AND NANOTECHNOLOGY (SAMN2017) 17 JULY 2017



ROAD TOUR BY DEPUTY VICE CHANCELLOR (RESEARCH & INNOVATION) PROF. DATO' DR. HUSAINI OMAR 15 AUGUST 2017



VISIT FROM MRSM MUAR 24 AUGUST 2017



IEEE TECHNICAL TALK 2017 11 OCTOBER 2017



TOP SHOT

TENGGU PERMAISURI NORASHIKIN VISITED ITMA'S BOOTH DURING 41ST CONVOCATION AND AGRICULTURAL EXPO 2017





FURTHER INFORMATION

Contact Us

ITMA Publication
Institute of Advance Technology
Universiti Putra Malaysia
43400 UPM Serdang, Selangor
T : +603-8946 7834
E : itma@upm.edu.my
W : www.itma.upm.edu.my

 www.facebook.com/instituteofadvancedtechnology
 <http://www.youtube.com/> (Search for : ITMA UPM)
 <http://www.instagram.com/institutteknologimaju/>