RAMLI SITANGGANG
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TECHNOLOGY PRODUCT

PROTOTYPE INNOVATIVE SPRAYING TECHNIQUE OF GAS DIFFUSION ELECTRODE (GDE) IN FUEL CELL

2004

FURTHER INFORMATION PLEASE CONTACT :
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- DEPARTMENT OF CHEMICAL & PROCESS ENGINEERING
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- UNIVERSITI KEBANGSAN MALAYSIA
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KARYA MONUMENTAL

KEILMUAN ENERGI BARU TERBARUKAN BIDANG TEKNOLOGI FUEL CELL

TECHNOLOGY PRODUCT YANG TIDAK DIPATENKAN

Petunjuk
Membuat rancangan dan karya teknologi yang tidak dipatenkan; rancangan dan karya seni monumental/seni pertunjukan; karya sastra:
Berdasarkan" Pedoman operasional penilaian angka kredit kenaikan pangkat/jabatan akademik dosen"
Direktorat jenderal pendidikan tinggi kementerian pendidikan dan kebudayaan tahun 2014

2001-2017

Certificate of award

ASEAN Energy Awards 2007
23rd August 2007
Shangri-la Hotel Singapura

The ASEAN energy awards 2007 were awarded to energy projects in the ASEAN region that adopt best practices in energy efficiency and conservation, energy efficient buildings, renewable energy project, energy management in building and industry and excellence in energy management. The Fuel Cell Design and Prototyping Group within the Process System Engineering of Fuel Cells Research Group in the Institut Sel Fuel (The Institute of Fuel Cell), Universiti Kebangsaan Malaysia, lead by Prof. Ir. Dr. Hj. Wan Ramli Wan Daud, the Founder Director of the Institute was awarded the Winner in the Special Submission Category in The 8ih ASEAN Best Practices for Energy Efficient Buildings Competition for their entry, Small-Scale Portable Fuel Cell Power at Universiti Kebangsaan Malaysia during the ASEAN Energy Awards Night gala dinner on the 23rd of August 2007 at the Shangri-La Hotel Singapore. The special submission category refers to special projects which study, apply and/or develop innovative use of technologies (including R&D projects) which could be applied to reduce energy consumption in buildings. The aim is to promote the development of innovative energy efficiency-related solutions together with ASEAN wisdom. The award consists of a plaque and a certificate. Members of the Winning Fuel Cell Design and Prototyping Group are: Prof. Ir. Dr. Hj. Wan Ramli Wan Daud, Prof. Dr. Hj. Jaafar Sahari, Prof. Dr. Hj. Abu Bakar Mohammad, Prof. Dr. Kamaruzzaman Sopian, Prof. Dr. Abdul Amir Hassan Kadhum, Prof. Dr. Che Hassan Che Haron, En. Masli Irwan Rosli, En. Shahbudin Mastor, Dr. Edy Herianto, Dr. Ramli Sitanggang and En. T. Husaini. The awards could not have been won without the great help and support of the supporting staff of the Institut Sel Fuel, Cik Norly Ishak and En. Arrif Fadzillah Haron and other research groups at the Institute.

PROTOTIPE
INNOVATIVE SPRAYING TECHNIQUE OF GAS DIFFUSION ELECTRODE (GDE) IN FUEL CELL

Abstract

The **innovative spraying technique** developed in order to fabricate various sizes of thickness and porosity of gas diffusion layer electrode (GDLE) used in the proton exchange membrane fuel cell (PEMFC). The X-Y spraying arm of the Robotic Spraying Machine can be manipulated. Fluid is sprayed using a periodic function and configuration of making $GDLAT_{2,4}$ (0.5,1.75) $ET_{3.5}$ (0.5,1.75) to the surface of carbon paper to produce any spraying pattern for the ink.

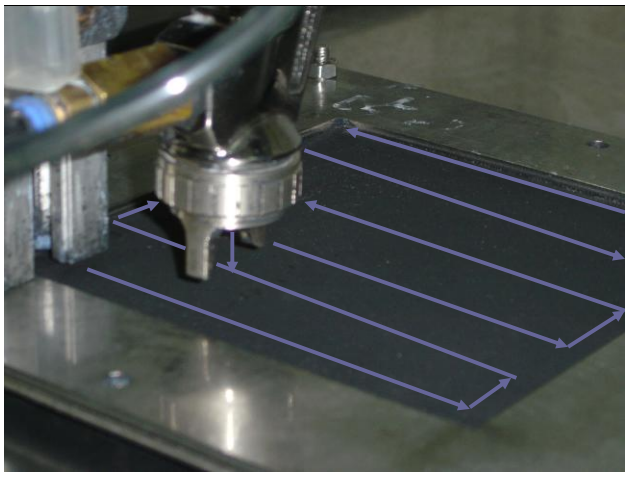


Figure . **Innovative spraying technique** pattern for the ink

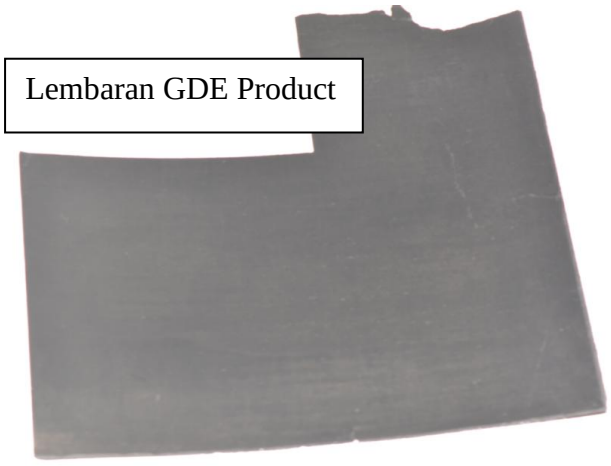
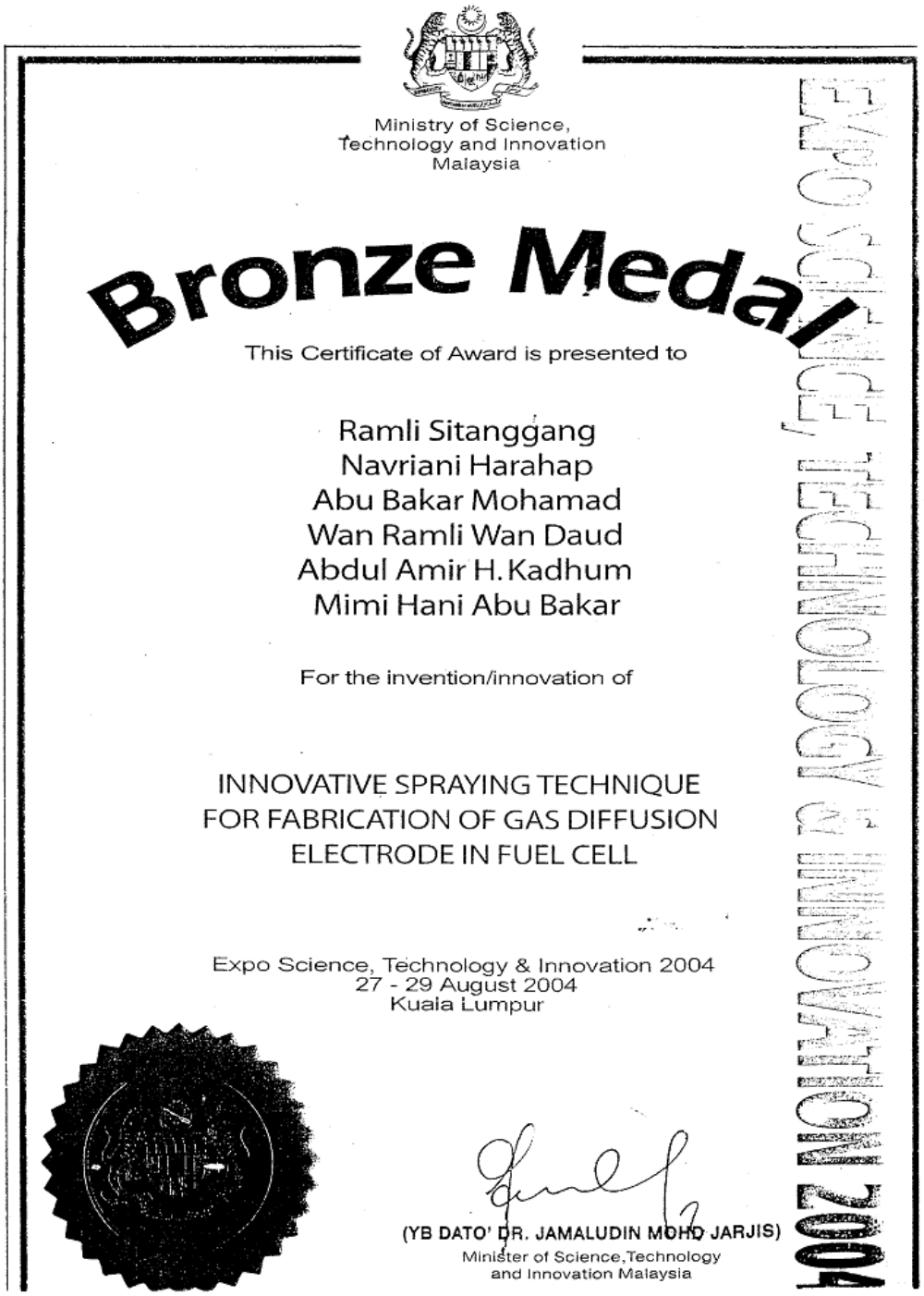


Figure. GDLE product with Configuration $GDLAT_{2,4}$(0.5,1.75) $ET_{3,5}$(0.5,1.75).

TOR PRODUK TEKNOLOGI

Bidang Keilmuan		Energi baru terbarukan bidang Teknologi Fuel Cell
Program		Membuat rancangan dan karya teknologi yang tidak dipatenkan; rancangan dan karya seni monumental/seni pertunjukan; karya sastra Applikasi Sain Fuel Cell
Output Program		PROTOTIPE INNOVATIVE SPRAYING TECHNIQUE OF GAS DIFFUSION ELECTRODE (GDE) IN FUEL CELL
Acknowledgement		The financial support from the Malaysian Ministry of Science, Technology and Environment, through IRPA Project 08-02-02- 0020 is much appreciated.
KEGIATAN MENILAIKAN PRODUK TEKNOLOGI MELALUI PAMERAN/PERTUNJUKAN LOKAL/NASIONAL /INTERNASIONAL		
Materi Pameran		**INNOVATIVE SPRAYING TECHNIQUE OF GAS DIFFUSION ELECTRODE (GDE) IN FUEL CELL**
Tingkat Pameran		NASIONAL Ministery Science Technology & Innovation Malaysia
Output Pameran (Penilaian)		MEDALI PERAK
Indikator Kinerja Kegiatan		Pameran /pertunjukan Produk Teknologi
Jumlah Pameran (Output)		1
Kode Penilaian		II.E.2
Bukti kinerja		1 SERTIFIKAT Review
Kredit Paling Tinggi		15
Usulan Nilai PROTOTIPE **INNOVATIVE SPRAYING TECHNIQUE OF GAS DIFFUSION ELECTRODE (GDE) IN FUEL CELL**		15
Alamat teknologi		Institut Fuel Cell UKM
Reviwer Curriculum Vite terlampir		• PROF. IR. DR. HJ. WAN RAMLI WAN DAUD • Department of chemical & process engineering, Faculty of Engineering, Universiti Kebangsan Malaysia, 43600UKM Bangi, Selangor Darul Ehsan, Tel: 03-8921 6412 fax: 03-8921 6148

Certificate of award



Ministry of Science,
Technology and Innovation
Malaysia

Bronze Medal

This Certificate of Award is presented to

Ramli Sitanggang
Navriani Harahap
Abu Bakar Mohamad
Wan Ramli Wan Daud
Abdul Amir H. Kadhum
Mimi Hani Abu Bakar

For the invention/innovation of

INNOVATIVE SPRAYING TECHNIQUE
FOR FABRICATION OF GAS DIFFUSION
ELECTRODE IN FUEL CELL

Expo Science, Technology & Innovation 2004
27 - 29 August 2004
Kuala Lumpur

(YB DATO' DR. JAMALUDIN MOHD JARJIS)
Minister of Science,Technology
and Innovation Malaysia

2004 INNOVATIVE TECHNOLOGY AWARD

Peer Review Summary

Date	Signature
Reviwer	• PROF. IR. DR. HJ. WAN RAMLI WAN DAUD • Department of chemical & process engineering, Faculty of Engineering, Universiti Kebangsan Malaysia, 43600UKM Bangi, Selangor Darul Ehsan, • Tel: 03-8921 6412 fax: 03-8921 6148

Title:

PROTOTIPE

INNOVATIVE SPRAYING TECHNIQUE OF GAS DIFFUSION ELECTRODE (GDE) IN FUEL CELL

Ramli Sitanggang
Teknik Kimia, FTI, UPN "Veteran". Jl. SWK 104 Condongcatur, Yogyakarta, Indonesia, 55283

Content

1. FIELD OF TECHNOLOGY

The GDE product is a combination of gas diffusion layer (GDL) with electrodes (E) which serves as a fuel gas distributor on the electrode, as well as a catalyst for producing electrons. In addition it distributes water vapor on the surface of the electrode pores, prevents the water flood phenomenon at E and also transmits the electrons to bipolar. In this technology, **Innovative spraying technique is to produce Gas Diffusion Electrode (GDE)** product in accordance with the desired E Design.

2. BACKGROUND OF THE TECHNOLOGY

To obtain GDE in accordance with the ink design is sprayed with spray technique configuration.
Perform the Fuel Cell depends largely on the GDE layer structure expressed in thickness, porosity and active surface area, either for GDL or electrode (E) on the surface of the GDL. To get the size of the electrode (E) which produces high MEA performance, it needs an **innovative spraying technique** that is a spray technique configuration. In this

technology, the material composition used Pt / C powder (20%), Nafion® solution (5%), and isopropyl alcohol (89%). Pt / C ratio with Nafion® solution is 0.7: 0.3 or Platinum density at 0.28 mgPt cm-2. The Platinum ratio with water is 1: 20. These ingredients are mixed in the stirring tank. The stirring is carried out with a velocity of 1200 turns per minute for 10 minutes. The result of this mixing is called Dakwad. Dakwad is sprayed with a specific spray technique configuration.

3. SUMMARY OF TECHNOLOGY /PRINCIPLES OF TECHNOLOGY

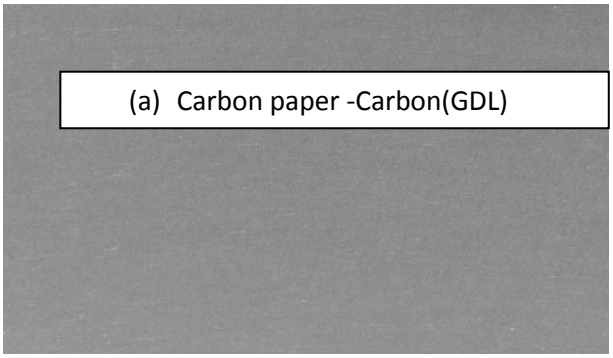
Fabrication of GDE through the configuration of **Spraying technique** stated below,

$$GDLAT_{h,i}(N_h,N_i)ET_{x,y}(N_x,N_y)NAE_w(h)A_x(j)Al_y(k)Pt_z(\%)$$

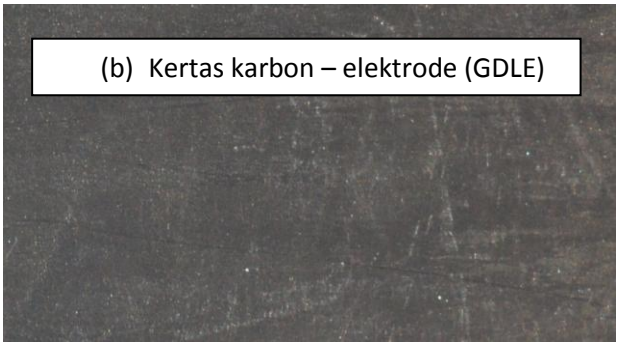
GDLA	is a gas adsorbent layer on the anode portion,
$GDLAT_{h,i}$	is a type of GDLA design
$ET_{x,y}$	is the type of design of the Electrode
N_x	is a spray number (N_{spray}),
N_y	is a spray number (N_{spray})
NAE_w	is the concentration of Nafion® on the anode portion of h
A_x	is the water concentration of j
Al_y	is the alcohol concentration of k
Pt_z	is a platinum catalyst concentration.
h	is the number of GDL design types
i	is the amount of spray done
x	is the number of anode electrodes
y	is a number that indicates the various thickness of the electrode layer

Configuration of **Spraying technique** on the anode:

$$CONF.1: CONF.\ 3.:GDLAT_{2,4}(0.5,1.75)\ ET_{3,5}(0.5,1.75)$$

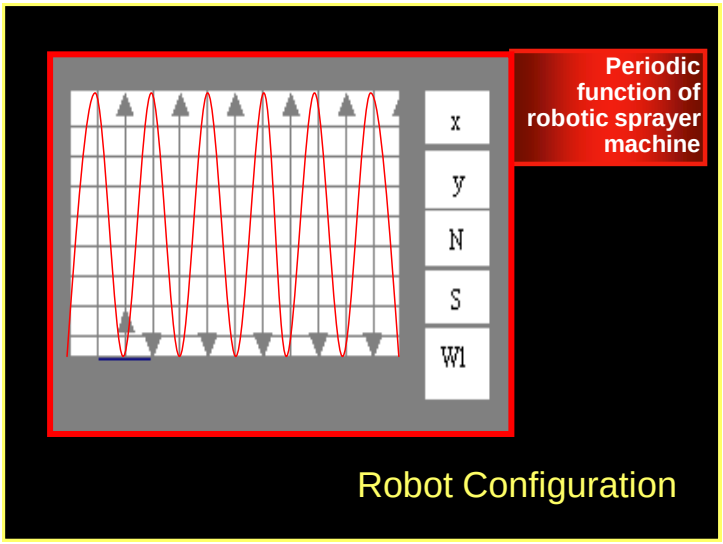


Gas Diffusion Layer (GDL) as shown in Figure (a). Configuration **Spraying technique** above GDL such as Figure (b) called Gas Diffusion Layer Electrode (**GDLE**).



4. BRIEF DESCRIPTION OF THE DRAWINGS/SPECIFICATION

The X-Y spraying arm of the Robotic Spraying Machine can be manipulated to produce any spraying pattern for the ink. The multi-phase dispersions (e.g. ink, alcohol and water) mix in continuous phase of air / nitrogen within the nozzle to produce a homogenous fluid. Fluid is sprayed to the surface of carbon paper with a periodic function. The spray nozzle is moved with a periodic function corresponding to the x-y axis as shown in Fig.

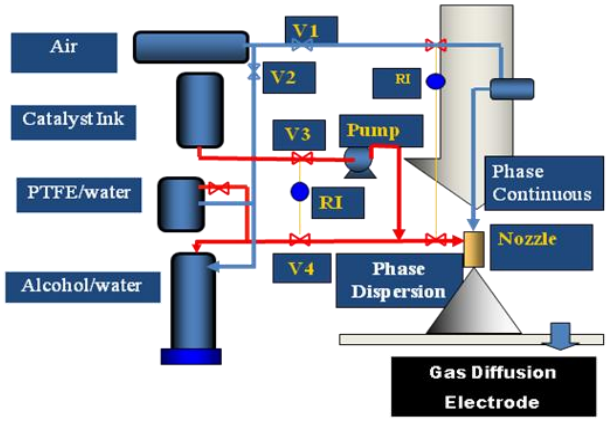


Periodic function of robotic sprayer machine

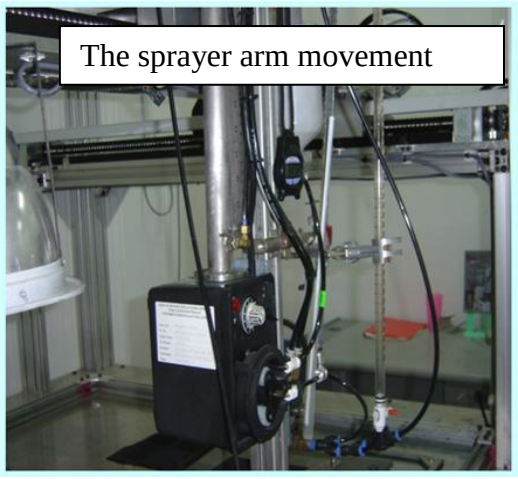
Periodic function depends on The sprayer arm movement is defined as the Number sprayer machine (N_{spray}) that depends on substrate division number (N), nozzle speed (S), nozzle spraying distance (W) and dimension of substrate (x, y).

5. DETAILED DESCRIPTION OF THE TECHNOLOGY

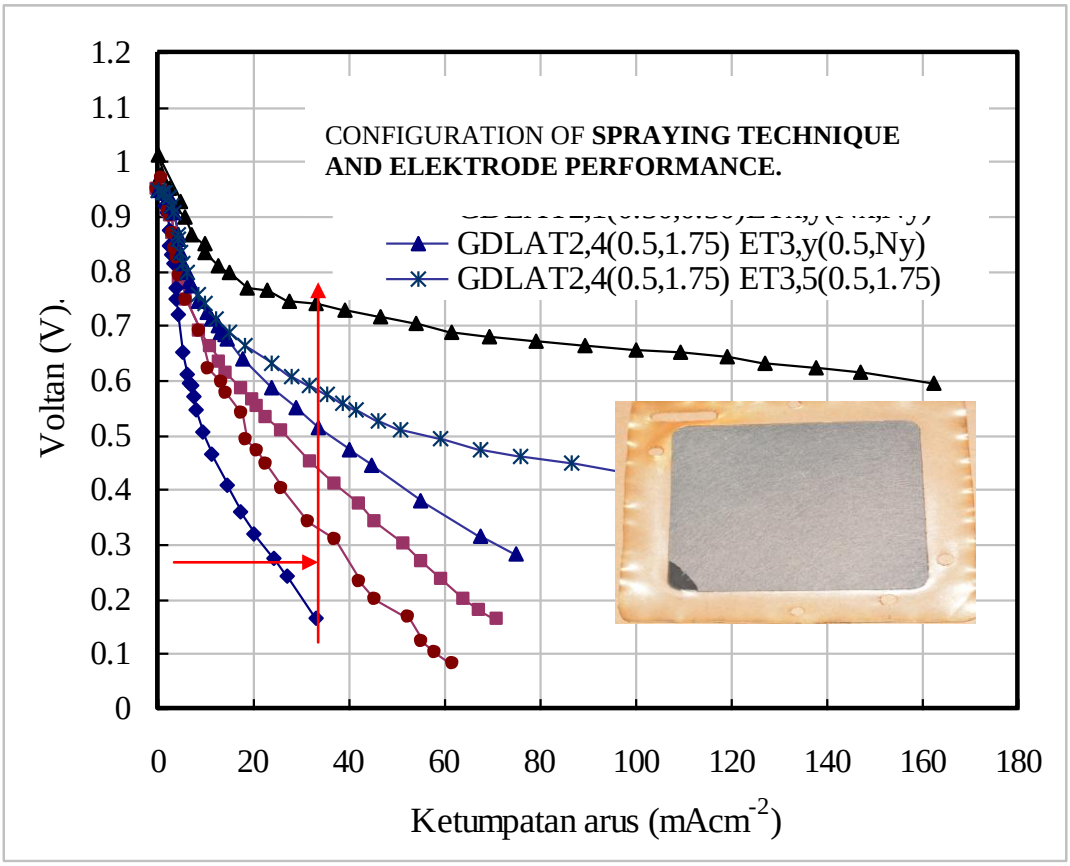
GDE creation flow chart



The sprayer arm movement



The GDE manufacturing flow chart is shown in Fig. Operation for direction control and nozzle height with a certain number. Heating is turned on and maintained at 60^{o}C. The air compressor is powered by airflow control at 4 kgcm^{-2} using V1. The type of operating nozzle design is established and the stirrer on the stirred tank containing the fluid is switched on. The nozzle will be set over the surface of the GDL heater to be sprayed. The spray detail number, N is set by using the PLC panel. Once the GDL temperature reaches 60^{o}C, the pump is switched on and the catalyst ink velocity is adjusted to suit the requirements. Meanwhile, robotic tools are switched on as needed. After the spraying process is carried out, the substrates are left in the air for one hour. Then it is put in the heater at 80^{o}C for 3 hours. Then the hot press is done for 3 minutes at a temperature of 130^{o}C with a pressure of 50 kgcm^{-2}. To create an MEA. GDE test results from this **Innovative spraying technique**, **such as figure**



Characteristics of GDLE PEM FC

6. DOKUMENTATION GDE

CONF. 3.:GDLAT$_{2,4}$(0.5,1.75) ET$_{3,5}$(0.5,1.75)

Acknowledgements

The authors would like to express their gratitude to the UKM University and Environment of Malaysia for the financial support through IRPA grant: IRPA 02-02-02-0003-PR0023 11-08

BIODATA

Name: **PROF. DATO' IR. DR. WAN RAMLI BIN WAN DAUD**

Date of Birth: 27TH December 1955

Designation: Founding Director, Fuel Cell Institute UKM (2007-2013)

Professor of Chemical Engineering (since 1996)

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43600 UKM Bangi, Selangor
MALAYSIA
Tel.: 03-89118418
Fax : 03-89216148
E-mail: wramli@eng.ukm.my ; wramli@gmail.com

Order of Chivalry:

- Darjah Setia Pangkuan Negeri (D.S.P.N.) which carries the title Dato' from the Pulau Pinang State Government, Malaysia conferred on 28 August 2013.

Fellowship of Academy of Science:

- Elected Fellow of Academy of Science, Malaysia on 27 April 2012..

Academic& Professional Qualification:

- BEng (First Class Honours), Monash University, Victoria, Australiain Chemical Engineering 1978
- PhD, University of Cambridge, United Kingdom in Chemical Engineering1984
- Professional Engineer(Chemical Engineering),Board of Engineers Malaysia (Registration No.: 8561) (1996-now)
- Chartered Chemical Engineer,Institution of Chemical Engineers, United Kingdom andThe Engineering Council,United Kingdom (Registration No: 564829) (2007-now)

Academic Career:

- Tutor, Department of Chemical Technology, Faculty of Physical and Applied Sciences, Universiti Kebangsaan Malaysia (1979-1984)
- Lecturer, Department of Chemical & Process Engineering, Faculty of Engineering, Universiti Kebangsaan Malaysia (1984-1989)
- Head,Department of Chemical & Process Engineering, Universiti Kebangsaan Malaysia (1984–1988)
- Associate Professor, Department of Chemical & Process Engineering, Faculty of Engineering, Universiti Kebangsaan Malaysia (1989-1996)
- Deputy Dean, Faculty of Engineering, Universiti Kebangsaan Malaysia (1990–1993), (1995–1998)

- Professor of Chemical Engineering, Department of Chemical & Process Engineering, Faculty of Engineering, Universiti Kebangsaan Malaysia (1996-)
- Member of Senate, Universiti Kebangsaan Malaysia (1998–2004, 2014-2017).
- Chief Editor, Jurnal Kejuruteraan, The Journal ofthe Faculty of Engineering, UKM (1999–2004).
- Coordinator, MEng (ChemicaL Engineering) by course work,Department of Chemical & Process Engineering, Faculty of Engineering, Universiti Kebangsaan Malaysia (2000-2006).
- Founding Director, Fuel Cell Institute, Universiti Kebangsaan Malaysia (2007-2013)

1. Awards and Recognition:

a. International Awards

- One out of 3 Malaysians Listed in the World's Most Influential Scientific Mind 2015 by Thomson Reuters.
- Won Award for Excellence in Research in Drying of Agricultural Products and Outstanding Contribution to the Development of Drying Technology 2011
- Won Outstanding Contribution to the Drying Community Award 2009
- Won IChemE Highly Commended Shell Energy Award 2008
- Won 2 gold medals in Brussels 2007 and 2 gold medalsin Geneva 2001 and 2005 respectivley
- Won ASEAN Energy Awards in Singapore 2007 and in Phnom Penh 2005 respectivley
- Won 2 silver medalsin Brussels 2007 and 2 silver medals in Geneva 2001 and 2005
- Won 2 bronze medals ini Brussels 2007
- Won special award of Environmental Protection Society of Switzerland in 2001 dan special award of the Union of Innovators Croatia 2005.

List of International Awards

1. One of The World's Most Influential Scientific Mind 2015 by Thomson Reuters for publishing the most number of highly cited papers durng 11 year period 2003-2013.
2. Award for Excellence in Research in Drying of Agricultural Products and Outstanding Contribution to the Development of Drying Technology 2011 at The International Symposium of Processing and Drying of Foods, Vegetables and Fruits 11-12 April 2011
3. Outstanding Contribution to the Drying Community Award 2009 at the 6th Asia-Pacxific Drying Confernce (ADC 2009), 19-21 October 2009, Bangkok, Thailand
4. IChemE Highly Commended Shell Energy Award 2008 for LESTARI 5000 Innovative Fuel Cell Portable Power Generator. 29 October 2008, Hilton Metropole Hotel, NEC, Birmingham, UK.
5. Gold medalfor inventing LESTARI 5000™ Fuel Cell Power Generator, World Exhibition Of Innovation, Research And New Technologies, Brussels, Belgium, 2007.

6. Gold medalfor inventing Solar Wind Hybrid Hydrogen Energy Production System For Remote Islands, World Exhibition Of Innovation, Research And New Technologies, Brussels, Belgium, 2007.
7. Silver medalfor inventing Solar Hydrogen Eco House, World Exhibition Of Innovation, Research And New Technologies, Brussels, Belgium, 2007
8. Silver medalfor inventing Compact Pressure Swing Adsorption System for Hydrogen Purification di PEMFC System, World Exhibition Of Innovation, Research And New Technologies, Brussels, Belgium, 2007
9. Bronze medalfor inventing Continuous Solar Assisted Drying System For Herbs, World Exhibition Of Innovation, Research And New Technologies, Brussels, Belgium, 2007
10. Bronze medalfor inventing Multi-Functional Cu-Zn-Al/ZSM-5 Catalyst for Hydrogen Production, World Exhibition Of Innovation, Research And New Technologies, Brussels, Belgium, 2007
11. ASEAN Energy Awards for inventing Small Scale Portable Power Fuel Cell Suitable for Building, Special Submission Category of the Energy Efficiency and Conservation Best Practices Competition, for Energy Efficient Buildinp 2007.
12. Silver medalfor inventing SERINDIT II: Zero Emission Vehicle, 34th Salon International Des Inventions Geneve, 2006
13. Special Award Union des Innovateurs de la Croatie for inventing SERINDIT II: Zero Emission Vehicle, 34th Salon International Des Inventions Geneve, 2006
14. Gold medalfor inventing a solar dehumidification system for drying of medicinal herbs, 33rd Salon International Des Inventions Geneve, 2005
15. Silver medalfor inventing catalysts for hydrogen production from methanol, 33rd Salon International Des Inventions Geneve, 2005
16. ASEAN energy award for inventing Solar Hydrogen Eco-House in Phnom Phen, Cambodia, 2005.
17. Gold medalfor inventing a very efficient solar dryer, 29th Salon International Des Inventions Geneve, 2001.
18. Jury award for inventing a very efficient solar dryer, 29th Salon International Des Inventions Geneve, 2001.
19. Environmental award Swiss Society for the Protection of the Environment for inventing a very efficient solar dryer, Salon International Des Inventions Geneve 2001.
20. Best Design Prize for Universities in Victoria, Australia, Institution of Chemical Engineers, UK, Victoria Branch, 1978.
21. Shell award for best student, Monash University, 1976
22. Aluminium Council award for best student, Monash University, 1976
23. Best Student Award dalam Leaving and Matriculation Examinations 1974, Leederville Technical College, Leederville, Western Australia

b. National Awards

- Won the Merdeka Award 2016 for Oustanding Scholastic Achievement in Research and Development of Fuel Cells and Hydrogen Energy in Malaysia and the region.

- Elected Fellow of Academy of Science Malaysia 2012
- Won1 gold medal and Best of the Best Award at PENCIPTA2013, 1 gold medalat ITEX 2010, 2 gold medals at ITEX 2009, 1 gold medalat MTE 2007, 1 gold medalat ITEX 2006, 1 gold medalat ITEX 2005, 2 gold medals at IPTA 2005 and 1 gold medalat ITEX 2000.
- Won 1 silver medalat MTE20009, 2 silver medals at MTE 2007, 1 silver medalat MTE 2006, 5 silver medalat ITEX 2005, 2 silver medals at IPTA 2005 and 1 silver medalat EXPO S&T 2004
- Won 2 bronze medalsat MTE 2009, 3 bronze medalsat MTE 2006, 3 bronze medals at ITEX 2005, 1 bronze medal atPencIPTA 2005, 7 bronze medals at EXPO S&T 2004 and 1 bronze medalat ITEX 2003
- Won Anugerah Saintis Cemerlang 2005, The Henry Goh award at ITEX 2000 and the MBf-Persatuan Penterjemah Malaysia Best Translated Book Award in Science & Technology for 1994 for translation of Chemical Engineering: Introduction to Design by R. K. Sinnot in 1994.

List of National Awards

1. The Merdeka Award 2016 for Oustanding Scholastic Achievement in Research and Development of Fuel Cells and Hydrogen Energy in Malaysia and the region.
2. Gold Medal and the Best of the Best Award at the PENCIPTA 2013 exhibition for inventing the Fuel Cell Hydrogen Car on 7-9 November 2013
3. Fellow of Academy of Science Malaysia on 27th April 2012
4. Gold medalfor inventing Direct Methanol Fuel Cell As Hydbrid Mobile Phone Charger, 21st ITEX 2010, 14-16 May 2010.
5. Silver medalfor inventing Direct Methanol Fuel Cell As Renewable Energy Power Resources For Small Portable Application, 9th malaysia technology expo 2010, 4-6 february 2010.
6. Silver medalfor Inventing Electrocoagulation System For Hydrogen Production And Palm Oil Mill Effluent Treatment, 9th MTE 2010, 4-6 February 2010
7. Silver medalfor inventing MEA Fabrication For Fuel Cell Using Casting Technique, 9th MTE 2010, 4-6 February 2010
8. Gold medalfor inventing DMFC for hybrid handphone charger, 21st ITEX 2010, 14-16 May 2010
9. Gold medalfor inventing Industrial Wastewater As A Fuel For Power Generation Using A Biological Fuel Cell, ITEX 2009.
10. Gold medalfor inventing Renewable Hydrogen Production Using Waste Aluminium, ITEX 2009.
11. Silver medalfor inventingμDMFC: AnAlternative Power Source for Hand Phone, MTE 20009.
12. Bronze medalfor inventing Prototype Microbial Fuel Cell For Power Generation, MTE 2009.
13. Bronze medalfor inventingHybrid Heat Pump Dryer, MTE 2009.
14. Gold medalfor inventing Direct Methanol Fuel Cell for Portable Application,ITEX2008.
15. Pinat gangsa for inventing Integrated Photoelectrochemical Cell For Hydrogen Production From Direct Water Splitting From Light, MTE 2008
16. Gold medalfor inventing LESTARI 5000TM – 5 kW Portable Fuel Cell Generator, MTE 2007.
17. Silver medalfor inventing New Photocatalyst for Hydrogen Production, MTE 2007.

18. Silver medalfor inventing Novel-Multi-Function Cu-Zn-Al/ZSM-5 Catalyst for Hydrogen Production, MTE 2007.
19. Silver medalfor inventing Compact Pressure Swing Adsorption System for Hydrogen Purification, MTE 2006.
20. Bronze medalfor inventing LESTARI™ – Portable Fuel Cell Generator, MTE 2006.
21. Bronze medalfor inventing Novel Multi-function Cu-Zn-Al-Zeolite Catalyst for Hydrogen Production from Methanol, MTE 2006.
22. Bronze medalfor inventing Low Temperature Sn Promoted Catalyst for Hydrogen Production, MTE 2006.
23. Gold medalfor inventing LESTARI™ – 1 kW Portable Fuel Cell Generator, ITEX 2006.
24. Gold medalfor inventing A Two Stage Cross-Flow Fluidised Bed Dryer, ITEX 2005.
25. Siver medal for inventing Serindit A Fuel Cell Powered Scooter, ITEX 2005.
26. Silver medalfor inventing A Method For Producing MEA for PEM Fuel Cell, ITEX 2005.
27. Silver medalfor inventing Catalysts For Hydrogen Production From Methanol, ITEX 2005.
28. Silver medalfor inventing Polymer Composite Bipolar Plate for PEM Fuel Cell, ITEX 2005.
29. Silver medalfor inventing Compact Pressure Swing Adsorber For Hydrogen Purification, ITEX 2005.
30. Bronze medals for inventing Membrane Reactor For Pure Hydrogen Production, ITEX 2005.
31. Bronze medals for inventing Photocatalyst For Solar Hydrogen Production, ITEX 2005.
32. Bronze medals for inventing System Design For 5 Kw PEMFC System, the ITEX 2005.
33. Gold medalfor inventing Serindit II – Fuel Cell Vehicle, Pameran Penyelidikan and Pembangunan (R&D) IPTA 2005.
34. Gold medalfor inventing Solar Hydrogen Eco House, Pameran Penyelidikan and Pembangunan (R&D) IPTA 2005.
35. Silver medalfor inventing Low Temperature Catalyst Mo-Ni-Cu for Hydrogen Production From Methanol,Pameran Penyelidikan and Pembangunan (R&D) IPTA 2005.
36. Silver medalfor inventing Novel Multi-Function Cu-Zn-Al-Zeolite Catalyst For Hydrogen Production From Methanol, Pameran Penyelidikan and Pembangunan (R&D) IPTA 2005.
37. Bronze medalfor inventing Membrane Electrode Assembly Design, Pameran Penyelidikan and Pembangunan (R&D) IPTA 2005.
38. Anugerah Saintis Cemerlang (Excellent Scientist Award) 2005 oleh Menteri Pengajian Tinggi.
39. Silver medal for 1 kW Polymer Electrolyte Membrane Fuel Cell Prototype, Expo Science & Technology 2004.
40. Bronze medal for Compact Pressure Swing Adsorption System For Hydrogen Purification Dalam Polymer Membrane Fuel Cell System Cell, Expo Science & Technology 2004.
41. Bronze medalfor Polymer Electrode Membrane (Pem) Electrolyzer For The Production Of Hydrogen From Solar Energy Cell, Expo Science & Technology 2004..
42. Bronze medalfor Low Temperature Catalyst For Autothermal Methanol Steam Reforming To Produce Hydrogen Cell, Expo Science & Technology 2004..

43. Bronze medalfor Heterogeneous Photocatalyst Precursor For Hydrogen Production Cell, Expo Science & Technology 2004.
44. Bronze medal for inventing Inovative Spraying Technique For Fabrication Of Gas,Ffusion Electrode Dalam Fuel Cell Cell, Expo Science & Technology 2004.
45. Bronze medalfor Titanium Foam Bipolar Plate For Polymer Electrolyte Membrane Fuel Cell Cell, Expo Science & Technology 2004.
46. Bronze medalfor Inter-Digitated Flow Field Pem Fuel Cell, Expo Science & Technology 2004.
47. Silver medalfor inventing Solar Assisted Dehumidification System, ITEX 2003
48. Bronze medalfor inventing A Baffled Plate Fluidised Bed Dryer, ITEX 2003.
49. Gold medalfor inventing a Very Efficient Solar Dryer, ITEX 2000
50. The Henry Goh award for inventing A Very Efficient Solar Dryer, the ITEX 2000
51. MBf-Persatuan Penterjemah Malaysia Anugerha Buku Terjemahan Terbaik dalam Sains and Teknologi for 1994 fortranslation of Chemical Engineering: Introduction to Design by R. K. Sinnot in 1994
52. Gold medal, Institut Kimia Malaysia, forbest student in Chemistry paper, Malaysian Certificate of Education Examination 1973.

c. UKM Awards

1. Individual Researcher Award UKM 2009 at Majlis Anugerah Bestari UKM 2010.
2. Individual Researcher Award UKM 2005 at Majlis Anugerah Bestari UKM 2006.
3. Gold medaland Special Awardfor inventing Membrane Electrode Assembly Design di Ekspo Penyelidikan dan Inovasi UKM 2005.
4. Gold medalfor inventing SERINDIT II– Fuel Cell Vehicle di Ekspo Penyelidikan dan Inovasi UKM 2005
5. Gold medalfor inventing Reaction Kinetics of Hydrogen Production from Autothermal Steam Reforming of Methanol Using Mo-Ni-Co Catalyst di Ekspo Penyelidikan dan Inovasi UKM 2005
6. Silver medalfor inventing Novel Multi-function Cu-Zn-Al-Zeolite Catalyst for Hydrogen Production from Methanol di Ekspo Penyelidikan dan Inovasi UKM 2005
7. Bronze medalfor inventing Production of MembraneElectrode Assembly (MEA) forProton Exchange Membrane Fuel Cell By Using Sol-Gel Casting di Ekspo Penyelidikan dan Inovasi UKM 2005
8. Bronze medalfor inventing Electrically ConductingComposite Bipolar Plates di Ekspo Penyelidikan dan Inovasi UKM 2005
9. Bronze medalfor inventing Spouted Bed Dryer with Draft Tube di Ekspo Penyelidikan dan Inovasi UKM 2005
10. Publication Award UKM forarticlespublished in 2004 at Hari Kualiti Tahunan UKM 2005.
11. Excellent Service Award UKM for 2004 at Hari Kualiti Tahunan, UKM 2005.
12. Publication Award UKM – Buku dalam Sains, Teknologi dan Perubatan, 2004 forthe book Prinsip Reka Bentuk Proses Kimia published by the Institution of Chemical Engineers, Malaysia, 2002 at Hari Kualiti Tahunan, UKM 2004.
13. Gold medal for 1 kW polymer electrolyte membrane fuel cell prototype at the Ekspo Penyelidikan UKM 2004

14. Gold medal for compact pressure swing adsorption system for CO removal at the Ekspo Penyelidikan UKM 2004
15. Silver medal for solar hydrogen eco-house at the Ekspo Penyelidikan UKM 2004
16. Silver medal for Mangkin untuk penghasilan hidrogen daripada pembentukan semula metanol di the Ekspo Penyelidikan UKM 2004
17. Bronze medal for Sintesis dan pencirian fotomangkin tris- [1-(4- methoxyphenyl)-2-(4-carboxylphenyl)-1, 2-ethylenodithiolenic-s, s']tungsten untuk penghasilan hidrogen daripada air- di the Ekspo Penyelidikan UKM 2004
18. Bronze medal for Reaktor membran seramik –ptfe untuk penghasilan hidrogen di the Ekspo Penyelidikan UKM 2004
19. Bronze medal for PEM electrolyzer for the production of hydrogen from solar energy di the Ekspo Penyelidikan UKM 2004
20. Bronze medal for Prekursor fotomangkinheterogen untuk penghasilan hidrogen di the Ekspo Penyelidikan UKM 2004
21. Gold medalfor inventing Solar Photovoltaic Hydrogen Production System Emas di Ekspo Penyelidikan Dan Inovasi UKM 2003
22. Excellent Service Award UKM for 1995 di Hari Kualiti Yearan UKM 1996.

2. RECOGNITION

2.1 Keynote and Invited Lectures

- Presented 23international keynote lectures in China, India, Indonesia, Iran, Malaysia, Philippines,Singapore and Thailand
- Presented 10international invited lectures Iceland, Indonesia, Japan, Malaysia, Netherlands, Philippines &Russia
- Presented 10national keynote lectures

a. International Keynote Lectures

Year2017:

1. Wan Ramli Wan Daud. Microbial electrolysis cells, novel hydrogen production technology: issues and challenges, the 13th International Conference on Global Sustainability and Chemical Engineering (ICGSCE), 15–16 February 2017, Putrajaya, Malaysia
2. Wan Ramli Wan Daud. The blueprint of fuel cell industries in Malaysia, the 6th International Conference on Fuel Cells and Hydrogen Technology (ICFCHT2017) 12 –13 April 2017, Putrajaya, Malaysia.

Year 2015:

3. Wan Ramli Wan Daud. Microbial Fuel Cells: A Sustainable Emerging Fuel Cell Technology, The 5th International Conference on Fuel Cell & Hydrogen Technology (ICFCHT2015), 1-3 September 2015, Kuala Lumpur, Malaysia.
4. Wan Ramli Wan Daud. Carbon-Neutral Chemical Engineering. The 28th Symposium of Malaysian

Chemical Engineers (SOMCHE2015), 21 – 22 October 2015. Kuala Lumpur, Malaysia

Year2014:

5. Wan Ramli Wan Daud. New non-pt nanostructured electrodes & nanocomposite nafion & non-nafion proton exchange membranes for fuel cells application, The 27th Symposium of Malaysian Chemical Engineers & the 21st Regional Symposium of Chemical Engineerin, 29 – 30 October 2014. Taylor's University, Kuala Lumpur, Malaysia
6. Wan Ramli Wan Daud. Fuel cell vehicle: the future of zero emission transportation. The 3rd IET International Conference on Clean Energy & Technology CEAT2014, 24-26 November 2014, Merdeka Palace Hotel & Suites, Kuching, Sarawak, Malaysia

Year2013:

7. Wan Ramli Wan Daud Nanotechnology Applications In Hydrogen Energy & Fuel Cells, The 4th International Conference on Fuel Cell & Hydrogen Technology (ICFCHT2013), 10 October 2013, Jogjakarta, Indonesia

Year2012:

8. Wan Ramli Wan Daud Bioenergy and Sustainability. The 2nd Malaysian International Conference on Trends in Biotechnology (MICTriBE 2012) 3 -4Julai 2012, Langkawi, Kedah, Malaysia

Year 2011:

9. Wan Ramli Wan Daud Drying of Foods. International Conference of Chemical Engineering and Industrial Biotechnology (ICCEIB 2011) In conjunction with The 25th Symposium of Malaysian Chemical Engineers(SOMCHE2011) 30 November 2011, Kuantan, Pahang, Malaysia
10. Wan Ramli Wan Daud 2011. Clean Energy: Towards a Zero Emission and Carbon Free Future. Presented at the International Conference on Fuel Cell and Hydrogen Technology 2011 (ICFCHT2011), 22-23 November 2011, Kuala Lumpur, Malaysia.
11. Daud, W.R.W. 2010. Clean Energy for Tomorrow: Towards a Zero Emission and Carbon Free Future. Presented at International Workshop on Clean Energy, Faculty of Chemical Engineering, Babol Noshirvani University of Technology (BUT), Babol, Iran 2 May 2011.

Year2010:

12. Daud, W.R.W. 2010. Hydrogen fuel cells:the ultimate clean energy technology. Presented at the 17th Regional Symposium on Chemical Engineering (RSCE2010), Queen Sirikit National Convention Center, Bangkok, Thailand, 22nd -23rd November 2010.

Year 2009:

13. Daud, W.R.W. 2009. Fuel cell research trends: towards zero emission energy technology. Presented at the 16th Regional Symposium of Chemical Engineering (RSCE 2009), Manila Hotel, Manila, The Philippines, December 1st - 2nd 2009.
14. Daud, W.R.W. 2009. Recent Fuel Cells R&D in Malaysia. The 2nd International Conference on Fuel Cell & Hydrogen Technology, 28 -29 October 2009, Center of Material Technology, Agency for the Assessment and Application of Technology, Jakarta, Indonesia
15. Daud, W.R.W. 2009. Palm oil mill effluent, waste or resource? waste to energy: biohydrogen & microbial fuel cells, International Conference on the Future of the Palm Oil Business, ICPOB 2009, Hilton Phuket Arcadia, Phuket, Thailand, 19-20 February 2009.

Year 2007:

16. Daud, W.R.W. 2007. Technology policy and research progress of fuel cell in malaysia, The 2007 Conference on Fuel Cell Technology, 7th September 2007, Center of Material Technology, Agency for the Assessment and Application of Technology, Jakarta, Indonesia.
17. Daud, W.R.W. 2007. Fluidized bed dryers – recent advances, The Third Asian Particle Technology

Symposium, 3rd – 5th September 2007, Beijing, China.

18. Daud, W.R.W. 2007. National hydrogen & fuel cell development in Malaysia, Battery/Fuel Cell: Asia Market 2007, 29 - 30 May 2007, Swissôtel Merchant Court, Singapore.

Year2006:

19. Daud, W.R.W. 2006. Fuel cell as energy conversion device of the future. Presented at Malaysian Scientific Society (MSA) Golden Jubilee International Symposium on Public Understanding of Science and Technology (PUSAT) 2006, June 15-17, 2006, Corus Hotel, Kuala Lumpur, Malaysia
20. Daud, W.R.W. 2006. Development of indigenous fuel cell technology: the case for Malaysia, the 2nd PETRONAS International R&D Forum, 6-7th December 2006, Kuala Lumpur, Malaysia.

Year 2005:

21. Daud, W.R.W. 2005. Fluidised bed dryers : recent advances, Presented at 4th Asia-Pacific Drying Conference, ADC 2005, 13 – 16 December 2005, Kolkata, India
22. Daud, W.R.W. 2005. Fuel cell development in Malaysia Prospects for the future, Presented at The International Science Congress, ISC 2005, 4 - 6 August 2005, Kuala Lumpur Malaysia.

Year2003:

23. Daud, W.R.W. 2003. Novel fluidized bed technology, Presented at 3rdAsia-Pacific Drying Conference, ADC 2003, 1-3 Sep 2003, Bangkok, Thailand.

b. International Invited Lectures

Tahun 2011

1. Daud, W.R.W. 2011. Food Properties. The International Symposium of Processing and Drying of Foods, Vegetables and Fruits 2011 (ISPDFVF2011) on 11 April 2011 at the Kuala Lumpur Teaching Centre, The University of Nottingham, Malaysia Campus, Chulan Tower, Jalan Conlay, Kuala Lumpur, Malaysia

Year2010:

2. Daud, W.R.W. 2010. Fuel Cell & Hydrogen Energy R&D in Malaysia. The International Hydrogen Energy Development Forum 2010, February 3rd-4th, 2010, Kyushu University Ito Campus, Fukuoka, Japan.

Year 2009:

3. Daud, W.R.W. 2009. Country report on new energy related technology and policy in Malaysia. International Symposium on Sustainable Energy and Environmental Protection 2009 (ISSEEP 2009) & 6th Sustainable Energy and Environment Forum (6th SEE Forum), 23 – 26 November, 2009, Universitas Gadjah Mada, Yogyakarta, Indonesia

Year 2008:

4. Daud, W.R.W. 2008. Renewable energy research in Malaysia, UKM-Sri Wijaya Joint Colloquim on Chemical Engineering, 26-28th June 2008, Universitas Sri Wijaya, Palembang, Indonesia
5. Daud, W.R.W. 2008. Biofuel cells, Presented at ASEAN COST+3: New Energy Forum for Sustainable Environment (NEFSE), Clock Tower Centennial Hall, University of Kyoto, Japan, 26-27 May 2008.
6. Daud, W.R.W. 2008. Hydrogen energy R&D and roadmap for Malaysia, Presented at the II International Forum on Hydrogen Technologies for the Developing World, in conjunction with the 9th Steering Committee Meeting of the International Partnership for Hydrogen Economy (IPHE), 22 – 23 April 2008, Presdient Hotel, Moscow, Russia organised by the Federal Agency of Science, The Russian Federation.

Year 2006:

7. Daud, W.R.W. 2006. Fuel cells : green power system, Presented at International Conference on Green Chemistry: Malaysian Chemical Congress (MCC 2006), 19 – 21 September 2006, Sunway Pyramid Convention Centre, Petaling Jaya, Selangor, Malaysia.
8. Daud, W.R.W. 2006. Hydrogen economy: Perspectives from Malaysia which was presented at the International Seminar on the Hydrogen Economy for Sustainable Development, 28-29 September 2006, Reykjavik, Iceland organised by the Government of Iceland and the United Nations Department of Economic and Social Affairs.Hydrogen Economy: Perspective from Malaysia presented at the International Seminar on the Hydrogen Economy for Sustainabile Development, 28 -29 September 2006, Reykjavik, Iceland.

Year 2005:

9. Daud, W.R.W. 2005. Hydrogen fuel cells and alternatives in the transport sector: The case for Malaysia which was presented at the United Nations University (UNU) Conference on Hydrogen Fuel Cells and Alternatives in the Transport Sector: Issues for Developing Countries, UNU-INTECH, Maastricht, Netherlands, 7-9 November 2005

Year 2004:

10. Daud, W.R.W. 2004. The status of renewable hydrogen economy in Malaysia which was presented at the International Conference on Renewable Hydrogen Economy 2004, in conjunction with 2004 Philippine National Energy Week jointly organised by USAID and the Government of the Philippines, 7 – 9th August 2004, Makati, Manila, Phillipines

c. National Keynote Lectures

Year 2016:

1. Wan Ramli Wan Daud. Carbon-Neutral Chemical Engineering. The 28th Symposium of Malaysian Chemical Engineers (SOMCHE2015), 21 – 22 October 2015. Kuala Lumpur, Malaysia

Year 2008:

2. Daud, W.R.W. 2008. Renewable energy research in Malaysia, Technology Business Innovation Forum, Technology Park Malaysia, Bukit Jalil, Kuala Lumpuir, 9th July 2008.
3. Daud, W.R.W. 2008. Energy scenario for Malaysia, IChemE Technical Roadmap for 21st Centry Chemical Engineering, Sime Derby Convention Centre, Kuala Lumpur, 12th May 2008.
4. Daud, W.R.W. 2008. Fuel Cell R&D and Roadmap in Malaysia. Malaysian Chemistry Festival (MCF) 2008. PETROSAINS, Kuala Lumpur City Centre, Kuala Lumpur, Malaysia. 18 August 2008
5. Daud, W.R.W. 2008. Renewable Energy: Challenges in Malaysia. Energy Roundtable Discussion on New World Energy Order – An Inevitable Change? The 5th National Utilities Summit 2008: Plowing Through the New World Order - Towards Greener Developments, Greater Efficiency & Synergy. Nikko Hotel, Kuala Lumpur. 14 & 15 October 2008

Year 2007:

6. Daud, W.R.W. 2007. Of dyes and crystals: Applications of advanced materials and nanotechnology in chemical engineering, 21st Symposium of Chemical Engineer (SOMCHE2007), 12-13 December 2007, Universiti Putra Malaysia

Year 2006:

7. Daud, W.R.W. 2006. Fuel cells : green power system which was presented at Malaysian Chemical Congress 2006, 19 – 21 September 2006, Sunway Pyramid Convention Centre, Petaling Jaya.
8. Daud, W.R.W. 2006. Innovationand technology advancement breakthrough in fuel cell. Presented at the 20th Symposium of Chemical Engineer (SOMCHE2006), 19-21 December 2006, Universiti Teknologi

MARA, Shah Alam.

Year 2004:

9. Daud, W.R.W. 2004. Fuel cell development in Malaysia Prospects for the future, Presented at 18th Symposium of Malaysian Chemical Engineers, SOMCHE 2004, 13 – 14 December 2004, Universiti Teknology PETRONAS (UTP), Bandar Seri Iskandar, Ipoh, Perak.

Year 2000:

10. Daud, W.R.W. 2000. Advances in chemical process design and optimization presented at the 14th Symposium of Malaysian Chemical Engineers, 30 – 31 October 2000, Putra Jaya, Selangor

2.2 Membership of International Committees

- Chairman, Institution of Chemical Engineers UK, Malaysia Board 2009.
- Committee Member (as Malaysian BoardChairman), International Council, Institution of Chemical Engineers UK 2009.
- Deputy Chairman, Institution of Chemical Engineers UK, Malaysia Board 2008.
- Chairman, International Advisory Committee, 15th Regional Symposium on Chemical Engineering and the 22nd Symposium of Malaysian Chemical Engineers RSCE-SOMCHE 2008, 2-3 December 2008, Kuala Lumpur, Malaysia.
- Committee Member, Institution of Chemical Engineers UK, Malaysia Board 2007.
- Member, the International Advisory Committee of the Regional Symposium on Membrane Science & Technology (2004-kini).
- Member, the International Advisory Committee of the International Workshop & Symposium on Industrial Drying (2004).
- Member, the International Organising Committee the Asian Particle Technology Symposium (2003-kini).
- Chairman, International Organising Committee, 2nd Asian Particle Technology Symposium (APT 2003) held on 17- 19 December 2003, Penang, Malaysia.
- Member, the International Advisory Committee of the World Congress of Particle Technology (2002-2006).
- Member, the International Advisory Committee of the Regional Symposium of Chemical Engineering (2002-kini)
- Member, the International Advisory Committee the Asia-Pacific Drying Conference (2001-kini)
- Chairman, International Advisory Committee, 2nd Asia-Oceania Drying Conference (ADC'2001) 20 – 22 August 2001 in Penang, Malaysia

2.3 Member of Editorial Board/Referee/Reviewer of International Journals

- Guest Editor Special Issue of International Journal of Hydrogen Energy (SCOPUS/ISI) for the 3rd International Conference on Fuel Cell and Hydrogen Technology (ICFCHT2011), 22-24 November 2011, Malaysia
- Member of Editorial Board of Journal of Sustainable Energy and Environment published by the Joint Graduate School on Energy and Environment (JGSEE), King Mongkut's University of Technology Thonburi, Thailand

- Referee/Reviewer for the following journals:
  - Drying Technology (SCOPUS/ISI)
  - Solar Energy (SCOPUS/ISI)
  - International Journal of Hydrogen Energy (SCOPUS/ISI)
  - Chemical Engineering Science (SCOPUS/ISI)
  - International Journal of Food Engineering (SCOPUS/ISI)
  - Powder Technology (SCOPUS/ISI)
  - Chemical Engineering Research & Design (SCOPUS/ISI)
  - Separation Science & Technology (SCOPUS/ISI)
  - Sains Malaysia (SCOPUS/ISI)
  - World Applied Science Journal

2.4 External Examiner of Program/Department/Faculty, Assessor for accreditation Bodies & External Advisor of Phd & MSc Thesis

a. External Examiner of Academic Program

University	Program	Year
Universiti Sain Malaysia	BSc (Environmental Technology)	2011
Universiti Tun Hussein Onn Malaysia	BEng (Plant Engineering)	2010
Universiti Teknologi MARA	BEng (Chemical Engineering)	2005-2007
Universiti Teknologi Malaysia	BEng (Chemical Engineering)	2001
Universiti Teknologi MARA	BEng (Chemical Engineering)	1989-1991
Universiti Teknologi Malaysia	BEng (Chemical Engineering)	1988

b. Memberof Evaluation Panel for Board of Engineers Malaysia

University	Program	Year
Universiti Teknologi Petronas	SMKej (Kejuruteraan Kimia)	1998
Universiti Malaya	SMKej (Kejuruteraan Kimia)	1995

c. MemberEvaluation Panel for National Accreditation Board

University	Program	Year
Taylor's College	MEng (Chemical Engineering)	2004
Prime College	Diploma (Chemical Engineering)	2003

d. MemberEvaluation Panel for Engineering Accreditation Council

University	Program	Year
Universiti Teknologi Malaysia	BEng (Gas Engineering)	2013
Taylor University Malaysia	BEng (Chemical Engineering)	2012
Universiti Teknologi Petronas	BEng (Chemical Engineering)	2011
Monash University Sunway Campus	BEng (Chemical Engineering)	2010
Universiti Malaysia Perlis	BEng (Bioprocess Engineering)	2010
Universiti Sains Malaysia	BEng (Chemical Engneering)	2010

e. External Examiner of Thesis

University	Doctor of Philosophy	Master of Science	Total
Universiti Malaya	0	1	1
Universiti Sains Malaysia	1	6	7
Universiti Teknologi Malaysia	3	3	6
Univertsiti Putra Malaysia	0	5	5
Universiti Teknologi Petronas	1	0	1
University of Nottingham in Malaysia	1	0	1
International Islamic University Malaysia	1	0	1
Universiti Teknologi MARA	1	0	1
Universiti Malaysia Kelantan	0	1	1
Total	8	16	24

i List of PhD Thesis Examined as External Examiner

No.	Year	University	Student	Title
1.	2012	Universiti Teknologi MARA	Wan Ahmad Najmi Wan Mohamed	Solid-state Thermal Analysis of Air-cooled PEMFC with Predictive Empirical Profiling
2.	2011	International Islamic University Malaysia	Rashmi G. Walkevar	Experimental Studies and CFD Simulation on Convective Heat Transfer of CNT Nanofluids for Thermal Management
3.	2010	Universiti Teknologi Petronas	Umesh Basanaguuda Deshanavar	Studies on Hydrocarbon Fouling on Heat Transfer Surfaces
4.	2011	University of Nottingham in Malaysia	Ong Sze Pheng	Investigation of Engineering and Quality Properties of Salak Fruit in Heat Pump Assisted Intermittent Drying
5.	2010	Universiti Teknologi Malaysia	Inayati	Dynamic behaviour of Fuel Cell Powertrain
6.	2007	Universiti Teknologi Malaysia	Siva Kumar a/l Kumaresan	A Process Engineering Approach to the Standardization of Eurocomanone in Eurycoma Longifolia Water Extract
7	2005	Universiti Teknologi Malaysia	Chua Lee Suan	Chiral resolution of (R,S)-1-phenylethanol using immobilised lipases in batch stirred tank and recirculated packed bed reactors
8.	2002	Universiti Sains Malaysia	Mohd. Roslee bin Othman	Modification of commercial inorganic membrane with a thin layer that have finer and more uniform pores

i. List of MSc Thesis Examined as External Examiner

No.	Year	University	Student	Title
1.	2012	Universiti Sains Malaysia	Anis Suriani Binti Ibrahim	Application of the Monin-Obukhov Similarity Theory on Diurnal Wind Turbulence Statistics in the Urban

				Roughness Sublayer Using Local Scales
2.	2012	Universiti Malaysia Kelantan	Rizki Wannahhari	The Recovery of Used Palm Cooking Oil Using Bagasse as Adsorbent
3.	2012	Universiti Putra Malaysia	Wan Mohd.Fadli Wan Mokhtar	Empirical Modelling, Simulation and Control of Pasteurization Process with Fouling as Disturbance
4.	2009	Universiti Putra Malaysia	Keshani, S.	Mathematical Models For Prediction Of Rheological Parameters Of Pomelo Juice
5.	2008	Universiti Putra Malaysia	Nurul Faezawaty Jamaludin	Comparative Study on the Nutrient Retentivity and Thermal Process Capability of Ohmic Heated Pasteurizer
6.	2007	Universiti Putra Malaysia	Rozaihan binti Razali	A study of the effect of fermentation, drying technique and added carotene oil on nutritional value of cassava
7.	2005	Universiti Putra Malaysia	Soo Ching Yee	Dynamics and Convergence Aceleration of Rapid Pressure Swing Adsorption (RPSA
8.	2005	Universiti Sains Malaysia	Chieng Hui Yap	Penggunaan Sel Galvanik Yang Mempunyai Berbagai Konfigurasi Untuk Menurunkan Kromium Heksavalen Dalam Air Buangan Elektrosaduran
9.	2005	Universiti Teknologi Malaysia	Mak Weng Yee	Fault Detection and Diagnosis (FDD) Using Multivariate Statistical Process Control via Correlation Coefficients
10.	2005	Universiti Sains Malaysia	Chua Joo Hann	Adsorption of Fatty Acids using Metal Silica Complexes from Rice Husks
11.	2005	Universiti Teknologi malaysia	Rosiah Rohani	Preparation of proton exchange membrane by radiation-induced grafting method : Grafting of styrene onto poly(ethylene tetrafluoroethylene) copolymer films
12.	2000	Universiti Sains Malaysia	Yiu Pang Hung	Studies using the galvanic reduction process for hexavalent chromium in wastewater
13.	1999	Universiti Teknologi Malaysia	Lee Ting Hui	Hasil buangan nenas sebagai sumber karbon untuk penghasilan asid sitrik oleh Aspergillus sp
14	1999	Universiti Malaya	Abdul Basir Aziz Khan	An Epistemological Study of Malaysia's Science and Tehcnology Policy
15	1995	Universiti Sains Malaysia	Gurdeep Kaur a/p Bakjsis Singh	Pengembalian Hidrometalurgi Niobium dari sati Larutan Pemelarutresapan HF:HCl Kolumbit
16.	1999	Universiti Malaya	Abdul Basir Aziz Khan	National Science Policy

2.5 Appointment of Adjunct/Visiting Professor and Academic Assessor/Advisor

Appointment of Adjunct Professor

Period	Faculty/Department	University

2011-2012	Faculty of Mechanical Engineering	Universiti Tun Hussein Malaysia

Appointment of Visiting Professor

Period	Faculty/Department	University
27/07/ 2011	Faculty of Mechanical Engineering	Universiti Tun Hussein Malaysia

Appointment of Academic Assessor/Advisor

Period	Departmenty	University
2010-2012	Centre for Graduate Studies	Universiti Industri Selangor

Appointment of Company Associate

Date	Associate/Advisor	Company
09/2011	Senior Associate	Malaysia Industry Group For Hight Technology (MIGHT

3. RESEARCH

3.1 Fields of Research:

- Fuel cell technology: composite and inorganic electrolyte membranes, nanocatalyst electrodes, membrane electrode assemblies, stack and cell design and prototyping, fuel cell system design, solid oxide fuel cell, direct methanol fuel cell, microbial fuel cell
- Hydrogen energy: Nano-catalyst for autothermal steam reforming of alcohols, biohydrogen, solar hydrogen, photoelectrochemical cell
- Drying engineering: drum drying of starch slurries, fluidised bed and spouted bed drying of particulate materials, superheated steam drying of fibres, selective drying of multi-component solvents, drying kinetics and solar drying of agricultural crops and medicinal herbs
- Extraction: solvent extraction of antioxidants from spices and herbs, supercritical fluid extraction: thermodynamics and mass transfer of supercritical fluids and supercritical fluid extractions of anti-oxidants and essential oils from herbs
- Food properties: rheology of food material
- Design of membrane separation modules and adsorbers
- Process system engineering: process synthesis and optimization of chemical and biochemical processes including proton exchange membrane fuel cell systems
- Particle technology: flow properties of powders and fluidisation;
- History and philosophy of science and technology: Malay technology

3.2 List of Research Projects:

No.	Project Code	Project Titke	Role	Total grant (MYR)	Project period	Source of fund
1.	03-01-02-SF0985	Enhanced Hydrogen Production From Agro-Industrial Waste Using Bio-Electrochemical System And Thermophilic Fermentation	Project Leader	160,500	1/9/2013-29/2/2016	Sciencefund MOSTI
2.	LRGS/2013/UKM/TK	Zero Emission Fuel Cell Vehicle Powered by Hydrogen	Program Leader & Project Leader	7,000,000	1/7/2013-30/6/2016	LRGS, MOE
3.	FRGS/1/2013/TK05/UKM/01/1	Functional Spray Dried Amino Acid Powders With Controlled Polymorphs And Crystallinity	Project Leader	106,000	01/4/2013 -31/3/2016	FRGS, KPT
4..	DIP-2012-27	Sustainable Hydrogen Production Using Microbial Electrolytic Fuel Cell and Photoelectrochemical Cell	Project Leader	250,000	1/6/2012 – 30/5/2014	Dana Impak Perdana, UKM
5.	ERGS/1/2012/TK05/UKM/01/2	Combined Wastewater Treatment and Power (CWTP) Using High Power Density Microbial Fuel Cell	Project Leader	64,000	1/6/2012 – 1/6/2015	FRGS, KPT
6.	UKM-GUP-2011-368	Fluid Dynamic and Product Deposition in spray dryers	Project Leader	30,000	1/10/2011 – 30/09/2012	Geran Univer siti Penyelidikan, UKM
7.	UKM-AP-2011-02	Clean Energy for Tomorrow: Towars Zero Emission and Carbon Free Future	Project Leader	100,000	01/08/2011 - 31/07/2013	Projek Arus Perdana, UKM
8.	UKM-AP-TK-05-2009	New Materials for Fuel Cells and Hydrogen	Project Leader	730,000	01/07/2009 - 30/06/2011	Projek Arus Perdana
9.	UKM-GUP-TK-08-17-323	PEM Fuel Cell Stack with Sided Fuel Inlet and Integrated Stacking Device	Project Leader	300,000	01/05/2008 - 31/10/2010	Geran Univer siti Penyelidikan
10	03-01-02-SF0046	Computational fluid dynamics modelling of spray dryer with wall deposition	Project Leader	295,000	01/07/2007 - 01/07/2009	ScienceFund
11.	03-01-02-SF0396	Development of novel depositless spray dryer	Project Leader	211,000	01/08/2007 - 01/08/2009	ScienceFund
12.	03-01-02-SF0405	Development of low temperature solid oxide fuel cell electrolytes and electrodes	Project Leader	308,720	01/08/2007 - 01/08/2009	ScienceFund

13.	UKM-KK-02-FRGS0007-2006	Crystallization process of pharmaceuticals and macromolecules (proteins): Understanding polymorphism and chiral separation via molecular recognition and self assembly	Project Leader	90,000	01/11/2006 - 31/10/2009	Fundamental Research Grant Scheme (FRGS)
14.	UKM-MTSF-SELFUEL-2009	Optimization of Electricity Generation Using Microbial Fuel Cells for Wastewater Treatment	Project Leader	20,000	12/10/2009 - 31/12/2010	Malaysian Toray Science Foundation (MTSF)
15.	020202000PR0023/11	Development of Commercially Competitive Compact 5 kW Proton Exchange Membrane Fuel Cell System	Project Leader	30,054,764	2002-2007	IRPA
16.	0202020001PR0023/11-06	Design, simulation, fabrication and long term performance testing of a compact 5 kW proton exchange membrane fuel cell system	Project Leader	6,455,992	2002-2007	IRPA
17.	0202020006PR0023/11-11	Development of a dye-sensitised photoelectrochemical cell for the production of hydrogen by unassisted photolysis of water	Project Leader	2,038,332	2002-2007	IRPA
18.	0802020020	Volatile organic compounds removal technology based on thermal swing adsorption	Project Leader	1,600,000	1997-2000	IRPA
19.	0202020011	Development of photoelectrochemical cells for hydrogen production for fuel cell use	Project Leader	214,000	1999 – 2001	IRPA
20	0302020028	Novel drying technologies	Project Leader	880,000	1998 – 2002	IRPA
21	010703014	Drying of agricultural products	Project Leader	600,000	1988 – 1995	IRPA
22	03-01-02-SF0253	Superheated Steam Drying of Oil Palm Frond Chips in a Vibrating Fluidized Bed Dryer	Co-Researcher	283,000	2007-2009	ScienceFund
23	0902020127	Fluidized bed for dedusting and drying of padi	Co-Researcher	901,000	1997 – 2000	IRPA
24	02-02-02-0001-PR-23/11- 09	Development of an Onboard Low Temperature Autothermal Fuel Processor from Liquid Fuel	Co-Researcher	1,606,928	2000 – 2007	IRPA

25.	0202020002 PR0023/11-07	Development and long term performance testing of bipolar plates	Co-Researcher		2000 – 2007	IRPA
26	0902020091 EA234	Enhancing product purity and yield in the extraction of herbal oils using supercritical carbon dioxide	Co-Researcher	-	2003 – 2006	IRPA
27	02-02-02-0003-PR0023/11-08	Development And Long Term Performance Testing Of Membrane Electrode Assemblies (MEA) For Proton Exchange Membrane Fuel Cell	Co-Researcher	1,600,200	2000 – 2007	IRPA
28	02-02-02-0005-PR0023/11-10	Development Of A Solar Photovoltaic-Electrolyser Hydrogen Production System	Co-Researcher		2000 – 2007	IRPA
29	0902020011 EA066	Novel extraction of aqueous two-phase systems for recovery of bioproducts from fermentation broth	Co-Researcher	-	2001 – 2005	IRPA
30	0202020002	Development of a commercially competitive proton exchange membrane fuel cell	Co-Researcher	-	1996 - 1999	IRPA
31	0402020039	Development of computational fluid dynamics (CFD) analysis for flow in stirred tank reactor	Co-Researcher	-	2000 – 2002	IRPA

3.3 Research Collaboration

a. International Research Collaboration

No.	Researcher	Institution	Field of Research	Year
1.	Prof. Vijay Raghavan	Department of Bioresource Engineering, Faculty of Agricultural and Environmental Sciences, McGill University, Canada	Microwave-vacuum drying	2008-
2.	Prof. Nigel Brandon	Department of Earth Science & Engineering, Imperial College London, United Kingdom	Intermediate and low temperature anode, electrolyte and cathode for solid oxide fuel cells	2007-
3.	Prof. Nobuyoshi Nakagawa	Graduate Department of Chemical Engineering, Gunma University, Kiryu, Japan	Direct alcohol fuel cells	2007-

4.	Prof.Roberts, K.J.	Institute of Particle Science and Engineering, Leeds University, United Kingdom	Control of batch crystallisation of L-Isoleucine through on-line monitoring system	2005 – 2010
5.	Dr. Robert Driscoll	School of Chemical Engineering and Industrial Chemistry, University of New South Wales, Sydney, Australia	Fluidized bed drying of paddy	2005
6.	Prof.Dr. Ir.Tun Teja Irawadi, Dr.Ir.Irawadi Jamaran dan Prof.Ir. Maarimi	Bogor Agricultural University, Bogor, Indonesia	Supercritical Fluid Extraction (SFE) of Sea Cucumber	2006 - 2009
7.	Prof. Arun S. Mujumdar	Department of Mechanical and Production Engineering National University of Singapore	Industrial Drying Technology and Computational Fluid Dynamic in Dryers and in Fuel Cells	2004 -
8.	Assoc. Prof. Dr. Eric Bigerson	Department of Chemical and Biomolecular Engineering, National University of Singapore	Computational Fluid Dynamic in Fuel Cell	2004 -

b. National Research Collaboration

No.	Researcher	Institution	Field of Research	Year
1.	Pn. Nurul Fitriah Nasir	Faculty of Mechanical Engineering, Unoiversiti Tun Husseion Onn Malaysia	Modeling and optimization of continuous and batch biodisel processes using homogenouns and heterogeneous catalysts	2010-
2.	Assoc. Prof. Dr. Dominic Foo	Department of Chemical Engineering, Faculty of Engineering, University of Nottingham Malaysia Campus	Process system engineering of fuel cells	2009
3.	Assoc. Prof. Dr. Law Chung Lim,	Department of Chemical Engineering, Faculty of Engineering, University of Nottingham Malaysia Campus	Fluidized bed drying of padi, spray drying and two stage heat pump drying of fruits	2006 –
4.	Noornizar Anuar	Faculty of Chemical Engineering Universiti Teknologi MARA	Control of batch crystallisation of L-Isoleucine through on-line monitoring system	2005 –
5.	Dr. Ibnu Hajar Rukunudin, Ooi Ho	Malaysian Agricultural Research & Development	Drying of kenaf fibers	2002 - 2004

	Seng and Ten Seng Teik,	Institute		
6.	Dr. Mohd Zamri Ibrahim	Fakulti Sains, Universiti Malaysia Terengganu	Hybrid wind-PV solar hydrogen system	2003 – 2005
7.	Prof. Dr. Farid Ani Nasir	Faculty of Mechanical Engineering, Universiti Teknologi Malaysia	Preparation and characterization of carbon molecular sieve produced from oil palm	2004 – 2006
8.	Pro.f Dr. Hamdani Saidi, Prof. Dr. Ahmad Fauzi Isnmail, Prof. Dr. Nor Aishah Saidina Amin dan Assoc. Prof. Dr. Ahmad Rahman Songip	Faculty of Chemical & Natural Resources Engineeirng, Prof. Md. Nor Musa, Faculty of Mechanical Engineering, Universiti Teknologi Malaysia	Development of polymer electrolyte membrane fuel cell for mobile and portable application	1996 -

4 Intellectual Property

- Granted 8 patents by MyPO
- Granted 5World patents
- Filed 28 patentsatMyIPO
- Filed 1 trade mark atMyIPO

a. List of Patents Granted

No.	Inventors	Invention	Date Granted	Certificate No.
1.	Wan Ramli Wan Daud, Mohammad Kassim, Daik, R.&Arifin, K.	A Method of Producing a Photocatalyst	31/3/ 2011	MY-142900-A
2.	Wan Ramli Wan Daud, Kamaruzzaman Sopian, Ja'afar Sahari, Che Hassan Che Haron, Abu Bakar Mohamad, Abd. Amir Hassan Kadhum, Mohd. Shahbudin Mastar @ Masdar, Masli Irwan Rosli, Nik Suhaimi Mat Hassan, Sitanggang, R., Majlan, E.H.& T. Husaini	Water-Cooled polymer Electrolyte Membrane Fuel Cell Stack	21/12/2011	MY-145097-A
3.	Yaakob, Z., Mohd Adib Ibrahim, Wan Ramli Wan Daud & Abd. Amir H. Kadhum	Cu-Zn-Al Catalyst Supported on Zeolite for hydrogen production from methanol	15/3/ 2011	MY-142900-A
4.	Ja'afar Bin Sahari @ Shaari, Wan Ramli Wan Daud	A Method of Producing Bipolar Plate	15/12/2011	MY-144996-A
5.	Abu Bakar Mohamad, Wan Ramli Wan Daud, Abdul Amir Hassan Kadhum, Ramli Sitanggang, Mohd Shahbudin Masdar	Innovative Membrane Electrode Assembly (MEA) Design for Proton Exchange Membrane Fuel Cell (PEMFC)	15/8/2011	MY-144183-A
6.	Wan Ramli Wan Daud, Lorna Jefferey Minggu, Mohammad Kassim, Fadhli	A Photocatalyst for Hydrogen Production	29/7/2011	MY-143950-A

	Hadanah			
7.	Wan Ramli Wan Daud, Abu Bakar Mohamad, Ja'afar Bin Sahari @ Shaari, Abdul Amir Hassan Kadhum, Kamaruzzaman Sopian, Che Hassan Che Harun, Masli Irwan Rosli, Mohd Shahbudin Masdar, Edy Heriantyo Majlan, T. Hussaini, Nik Suhaimi Mat Hassan, Ramli Sitanggang	An Electrochemical Power Generator	29/8/2011	MY-144241-A
8.	Mohammad bin Kassim, Wan Ramli Wan Daud, Lorna Jefrey Minggu, Khuzaimah Ariffin, Fadhli Hadanah	Novel Photocatalysts & Preparation Method Thereof	13/1/2012	MY-145222-A

b. List of FiledWorld patents

No.	Inventors	Invention	Filing date	Published date	Reference No.
1.	Che Haron C H, Hassan Kadhum A A, Husaini T,Majlan E H, Mastar Masdar M S, Mohamad A B, Rosli M I,Sahari J, Sitanggang R, Sopian K, Wan Daud W R	Electrochemical power generator	02/01/ 2009	28/05/ 2009&22/10/ 2009	WO2009066 999-A2&WO200 9066999-A3
2.	Jeffery Minggu L, Wan Daud W R, Yaakob Z	Catalyst for producing hydrogen for proton exchange membrane fuel cell	02/01/ 2009	22/05/ 2009&22/10/ 2009	WO2009064 170-A2 & WO2009064 170-A3
3.	Hassan Khadum A A, Majlan E H, Mohammad AB, Mohammad A W, Takriff M S, Wan Daud W R	Compact pressure swing adsorption system for purifying hydrogen gas	02/01/ 2009	22/05/ 2009&22/10/ 2009	WO2009064 169-A2 & WO2009064 169-A3
4.	Daik R, Kassim M, Rahman F H, Wan Daud W R	Novel metal complex used as photocatalyst forproduction of hydrogen in photochemical cell	02/01/ 2009	04/06/2009 & 17/09/2009	WO2009070 000-A2; &WO200907 0000-A3.
5.	Abu Bakar M H, Hassan Kadhum A A, MohamadA B, Sitanggang R, Wan Daud W R	Impregnation of platinum on activated carbon, e.g. as catalyst in phosphoric-acid fuel cell	02/01/ 2009	07/05/2009 & 22/10/2009	WO2009057 992-A2 &WO200905 7992-A3.

c. List of Filed Patentsat MyIPO

No.	Inventors	Invention	Filing date	Reference No.
1.	Wan Ramli Wan Daud, Kamaruzzaman Sopian, Ja'afar Sahari, Che Hassan Che Haron, Abu Bakar Mohamad, Abd. Amir Hassan Kadhum,	A Fuel Cell Stack System For Vehicle Power Generation	10/07/2009	PI20092917

	Mohd. Shahbudin Mastar @ Masdar, Masli Irwan Rosli, Nik Suhaimi Mat Hassan, Sitanggang, R., Majlan, E.H.& T. Husaini 2009			
2.	Wan Ramli Wan Daud, Kamaruzzaman Sopian, Ja'afar Sahari, Che Hassan Che Haron, Abu Bakar Mohamad, Abd. Amir Hassan Kadhum, Mohd. Shahbudin Mastar @ Masdar, Masli Irwan Rosli, Nik Suhaimi Mat Hassan, Sitanggang, R., Majlan, E.H.& T. Husaini	Innovative 5kW Polymer Electrolyte Membrane Water-cooled Fuel Cell Stack	08/06/2009	PI20093256.
3.	Abu Bakar Mohamad, Abd. Amir Hassan Kadhum, Wan Ramli Wan Daud, Mimi Hani Abu Bakar &Sitanggang, R.	Ink Formulation Design Method	20/08/2009	PI20093454.
4.	Mohammad Kassim, Daik, R., Wan Ramli Wan Daud &Arifin, K.	Novel Photocatalyst and Preparation Method Thereof	08/09/2009	PI20093723.
5.	Kamarudin, S.K., Wan Ramli bin Wan Daud, Hasran, U.A.&Ahmad, M.M.	MesraUIKM: Passive Direct Methanol Fuel Cell for Portable Application	06/03/2009	PI20092260.
6.	Kamarudin, S.K., Wan Ramli Wan Daud, Hasran, U.A.&Basri, S.	MsfUKM: Design Advisor Tool for Direct methanol fuel Cell-DMFC	07/10/2009	PI20092910.
7.	Kamarudin, S.K., Wan Ramli bin Wan Dau, Hasran, U.A.&Hashim, N.	SFIONUKM: Passive Micro Direct Methanol Fuel Cell	22/06/2009	PI20092617.
8.	Wan Ramli Wan Daud, Abdul Wahab Mohammad, Yaakob, Z.& T. Husaini	An Integrated Membrane Reactor System for Hydrogen Gas Production	13/06/2008	PI20082106
9.	Wan Ramli Wan Daud, Mohammad Kassim, Daik, R.&Arifin, K.	A Method of Producing a Photocatalyst	14/07/2008	PI20082601
10.	Wan Ramli Wan Daud, Kamaruzzaman bin Sopian, Ja'afar Sahar, Che Hassan Che Haron, Abu Bakar Mohamad, Abd. Amir Hassan Kadhum, Mohd. Shahbudin Mastar @ Masdar, Masli Irwan Rosli, Majlan, E.H., Husaini &Sitanggang, R.	An Air-Cooled Electrochemical Power Generator (LESTARI 1000)	18/07/2008	PI20082673
11.	Wan Ramli Wan Daud, Mohammad Kassim, Daik, R.&Rahman, F.H.	A Method of Synthesizing a Photocatalyst for Hydrogen Production	18/11/2008	PI20084656
12.	Wan Ramli Wan Daud, Kamaruzzaman Sopian, Ja'afar Sahari, Che Hassan Che Haron, Abu Bakar Mohamad, Abd. Amir Hassan Kadhum, Mohd. Shahbudin Mastar @ Masdar, Masli Irwan Rosli, Herianto Majlan, T. Husaini &Sitanggang, R.	Polymer Electrolyte Membrane Fuel Cell Stack with Open Cathode	03/11/2008	PI20084371
13.	Ja'afar Sahari, Wan Ramli Wan Daud, Norhamidi Muhamad & Dedikarni Panuh	A Method of Producing Bipolar Plate		PI20083067
14.	Ja'afar Sahari, Wan Ramli Wan Daud, Norhamidi Muhamad & Dedikarni Panuh	Polymer Composite Bipolar Plate		PI20085127
15.	Yaakob, Z., Wan Ramli Wan Daud M. Rosli	Mo-Ni-Cu Catalyst	4/03/2008	PI20080488

	Yosfiah & Jamalaiah Jahim	on gamma Al2O3 Support for hydrogen production from methanol		
16.	Yaakob, Z., Mohd Adib Ibrahim, Wan Ramli Wan Daud & Abd. Amir H. Kadhum	Cu-Zn-Al Catalyst Supported on Zeolite for hydrogen production from methanol	4/08/2008	PI20080487
17.	Mohammad Kassim, Wan Ramli Wan Daud, Daik, R.&Rahman, F.H.	A Method of Synthesizing a Photocatalyst for Hydrogen Production	18/11/2008	PI20084656
18.	Wan Ramli Wan Daud, Abu Bakar Muhammad, Abdul Amir Hassan Kadhum, Jaafar Sahari, Kamaruzzaman Sopian, Masli Irwan Rosli & Shahbudin Mastar @ Masdar	An Electrochemical Power Generator (LESTARI)	21/12/2007	PI20072055
19.	Wan Ramli Wan Daud, Mohamad, A.B., Abdul Amir Hassan Kadhum, Yaakob, Z., Takriff, M.S.&Majlan, E.H.	Compact pressure swing adsorber for hydrogen purification (CPSA)	16/11/2007	PI20072029
20.	Wan Ramli Wan Daud, Mohammad Kassim, Mohamad, A.B., Abdul Amir Hassan Kadhum, Arifin, K.& Lorna Minggu	A photocatalyst for solar hydrogen production	28/11/2007	PI20072119.
21.	Yaakob, Z., Wan Ramli Wan Daud & Lorna Minggu	Cu-Zn-Al Catalysts Promoted With Palladium For Hydrogen Production From Methanol	16/11/2007	PI20072030.
22.	Abu Bakar Mohamad, Abdul Amir Hasan Kadhum, Wan Ramli Wan Daud, Mimi Abu Bakar &Sitanggang, R.	Process for Making Catalyst by Impregnation of Platinum of Activated Carbon	2/11/2007	PI20071902.
23.	Abu Bakar Mohamad, Abdul Amir Hasan Kadhum, Wan Ramli Wan Daud &Sitanggang, R.	Innovative Membrane Electrode Assembly (MEA) Design for Proton Exchange Membrane Fuel Cell (PEMFC)	19/12/2007	PI20072279.
24.	Yaakob, Z., Wan Ramli Wan Daud & Mohd Sabri Mahmud	Cu-Zn-Al Catalyst Promoted with Vanadium for hydrogen production from methanol		PI20072270
25.	Kamaruzzaman Sopian, Wan Ramli Wan Daud & Mohd. Zamri Ibrahim	Hydrogen Production Method (PV wind hydrogen production system)	13/11/2007	PI20071969
26.	Kamaruzzaman Sopian & Wan Ramli Wan Daud	A method for producing hydrogen and a system for supplying same to a building and/ or the	13/11/2007	PI20071970

		like (Solar hydrogen eco-house)		
27.	Kamaruzzaman Sopian, Wan Ramli Wan Daud & Mohd. Zamri Ibrahim	Polymer Electrolyte Membrane (PEM) electrolyzer for the production of hydrogen from solar energy	13/11/2007	PI20071971
28	Abu Bakar Mohammed (Project Leader),Wan Ramli bin Wan Daud,Abd. Amir Hassan Kadhum, Mahreni Akhmad. .	Self Humidified Nanocomposite Membrane Of Nafion-Sio2-Pwa	9 August 2010.	PI 201003752

d. Trade Mark

1. SERINDIT (07019005)

5 Publication:

ISI WOS Researcher ID: B-3635-2013

- Number of Indexed Articles WOS: 257
- H-Index ISI WOS (1995-2016) on 24May 2017: 33
- Total citations ISI WOS (1995-2017) on 24May 2017: 4117

SCOPUS Author ID: 35547717400

- Number of Indexed Articles SCOPUS: 305
- H-Index SCOPUS (1995-2016) on 24May 2017: 36
- Total citations SCOPUS (1995-2016) pada 24May 2017: 4926

GOOGLE SCHOLAR

- Number of Indexed Articles GOOGLE: 485
- H-Index GOOGLE SCHOLAR (1995-2016) on 24May 2017: 41
- Total citations GOOGLE SCHOLAR (1995-2016) on 24May 2017: 7151

Publication Summary:

Published 934articles:

- Published 342 articles in international journals,
- Published 367 articles in international conference proceedings
- Published 225 articles in national conference proceedings
- Published 2 international research books
- Published5chapters in international research books
- Edited 6 international conference proceedings
- Edited 8 journal issues as Chief Editor of Jurnal Kejuruteraan and Jurnal Kejuruteraan Kimia.

- Guest edited Special Issue of International Journal of Hydrogen Energy
- Published 2 national books
- Published5chapters in national research books
- Translated 2 books

a. Articlesin International Journals:

Year 2017:

1. Mohamed, W.A.N.W.,Talib, S.F.A.,Zakaria, I.A.,Mamat, A.M.I. &Daud,W.R.W. 2017.Effect of dynamic load on the temperature profiles and cooling response time of a proton exchange membrane fuel cell. Journal of the Energy Institute (In Press).
2. Daud, W.R.W., Rosli, R.E., Majlan, E.H., Hamid, S.A.A., Mohamed,R.& Husaini T. 2017. PEM fuel cell system control: A review. Renewable Energy 113: 620-638.
3. Lim, S.S., Yu, E.H., Daud, W.R.W., Kim, B.H. & Scott, K. 2017. Bioanode as a limiting factor to biocathode performance in microbial electrolysis cells. Bioresource Technology 238: 313-324.
4. Somalu, M.R., Muchtar, A., Daud, W.R.W. & Brandon, N.P.2017. Screen-printing inks for the fabrication of solid oxide fuel cell films: a review. Renewable and Sustainable Energy Reviews 75, 426-439.
5. Daud, W.R.W.,Kamarudin, S.K.,Ahmad, A.,Nasef, M.M. &Mohamad,A.B.2017. Preface to the special issue on “Sustainable fuel cell and hydrogen technologies: The 5th International Conference on Fuel Cell and Hydrogen Technology (ICFCHT 2015), 1–3 September 2015, Kuala Lumpur, Malaysia”. International Journal of Hydrogen Energy 42 (14), 8973-8974.
6. Masdar, M.S., Dedikarni, Zainoodin, A.M., Rosli, M.I., Kamarudin, S.K., Daud, W.R.W. 2017 Performance and stability of single and 6-cell stack passive direct methanol fuel cell (DMFC) for long-term operation. International Journal of Hydrogen Energy 42 (14): 9230-9242.
7. Rosli, R.E., Sulong, A.B., Daud, W.R.W., Zulkifley, M.A., Husaini, T., Rosli, M.I., Majlan, E.H.&Haque, M.A. 2017. A review of high-temperature proton exchange membrane fuel cell (HT-PEMFC) system. International Journal of Hydrogen Energy 42 (14): 9293-9314.
8. Satar, I., Ghasemi, M., Aljlil, A.S., Isahak, W.N.R.W., Abdalla, A.M., Alam, J., Daud, W.R.W., Yarmo, M.A., Akbarzadehh, O. 2017. Production of hydrogen by Enterobacter aerogenes in an immobilized cell reactor. International Journal of Hydrogen Energy42 (14): 9024-9030.
9. Ghasemi, M., Ahmad, A., Jafary, T., Azad, A.K., Kakooei, S., Daud, W.R.W. &Sedighi, M. 2017. Assessment of immobilized cell reactor and microbial fuel cell for simultaneous cheese whey treatment and lactic acid/electricity production.International Journal of Hydrogen Energy 42 (14): 9107-9115.
10. Jafary, T., Daud, W.R.W., Ghasemi, M., Kim, B.H., Bakar, M.H.A. & Jahim, J.M. 2017. Assessment of recirculation batch mode of operation in bioelectrochemical system; a way forward for cleaner production of energy and waste treatment. Journal of Cleaner Production142: 2544-2555.
11. Faisal, M.N., Mohamed, A., Hannan, M.A., Daud, W.R.W. & Majlan, E.H. 2017. An improved multidevice interleaved boost converter with novel multiplex controller for fuel cell. Jurnal Teknologi 79 (1): 143-151
12. Asri, N.F., Husaini, T., Sulong, A.B., Majlan, E.H. & Daud, W.R.W. 2017. Coating of stainless steel and titanium bipolar plates for anticorrosion in PEMFC: A review. International Journal of Hydrogen Energy 42 (14): 9135–9148.
13. Soo, L.T., Loh, K.S., Mohamad, A.B. & Daud, W.R.W. 2017. The effect of varying N/C ratios of nitrogen precursors during non-metal graphene catalyst synthesis. International Journal of Hydrogen Energy 42 (14): 9069–9076.
14. Ahmad, H., Kamarudin, S.K., Minggu, L.J., Hasran, U.A., Masdar, S. & Daud, W.R.W. 2017. Enhancing

methanol oxidation with a TiO2-modified semiconductor as a photo-catalyst. International Journal of Hydrogen Energy 42 (14): 8986–8996.

15. Lim, B.H., Majlan, E.H., Daud, W.R.W., Rosli, M.I. & Husaini, T. 2017. Numerical analysis of modified parallel flow field designs for fuel cells. International Journal of Hydrogen Energy. 42(14): 9210–9218.

Year 2016:

16. Wafi, N.I., Daud, W.R.W.,Majlan, E.H., Somalu, M.R. &Ahmad, A. 2016. Application of poly (2-hydroxyethyl methacrylate) gel electrolyte in electrochemical device: An overview. Int. J. Appl. Eng. Res 11:10043-10047.
17. Ch'ng, Y.Y., Loh, K.S., Daud, W.R.W. & Mohamad, A.B. 2016. Synthesis and characterization of sulfonated graphene oxide nanofiller for polymer electrolyte membrane. IOP Conference Series: Materials Science and Engineering 160 (1), 012035.
18. Fadzillah, D.M., Rosli, M.I., Talib, M.Z.M., Kamarudin, S.K. & Daud, W.R.W. 2016. Review on microstructure modelling of a gas diffusion layer for proton exchange membrane fuel cells. Renewable and Sustainable Energy Reviews (in Press).
19. Talib, S.F.A., Zakaria, I.A., Hamzah, W.A.W., Mamat, A.M.I., Ismail, H., Daud, W.R.W. & Mohamed, W.A.N.W. 2016. Effect of dynamic load on the temperature profiles and cooling response time of a proton exchange membrane fuel cell. J of Fuel Science and Technology, May 2016 (Submitted)
20. Arifin, K., Daud, W.R.W., Kassim, M.B. 2016. Molecular and electronic structures of a new ruthenium-tungsten bimetallic complex using density functional theory calculations. Malaysian Journal of Analytical Sciences, 20 (4):946-954.
21. Arifin, K., Kadir, H.A., Minggu, L.J., Daud, W.R.W., Kassim, M.B. 2016. TiO2 doped with Fe2O3 for photoelectrochemical water splitting electrode: Experimental and density functional theory study. Malaysian Journal of Analytical Sciences, 20 (4):892-900.
22. Masdar, M.S., Ngah, N., Mohamed Aslam, N., Panuh, D., Kamarudin, S.K., Daud, W.R.W. 2016. Effects of fuel concentrations, catalyst loadings and activation on the performance of direct formic acid fuel cell (DFAFC) stack. Malaysian Journal of Analytical Sciences, 20 (4):877-884.
23. Hamid, S.A.A., Rosli, R.E., Majlan, E.H., Wan Daud, W.R., Mohamed, R., Husaini, T., Sitanggang, R. 2016. Proton exchange membrane fuel cell/supercapasitor hybrid power management system for a golf cart Malaysian Journal of Analytical Sciences 20 (4):931-945.
24. Hamid, S.A.A., Majlan, E.H., Rosli, R.E., Daud, W.R.W., Mohamed, R., Husaini, T., Sitanggang, R. 2016. Energy management strategy for a fuel cell/ultracapasitor/battery hybrid system for portable applications. Malaysian Journal of Analytical Sciences 20 (4):955-964.
25. Rosli, R.E., Herianto Majlan, E., Abd. Hamid, S.A., Daud, W.R.W., Mohamed, R., Husaini, T., Rohendi, D. 2016. Study of hydrogen consumption by control system in proton exchange membrane fuel cell. Malaysian Journal of Analytical Sciences 20 (4):901-912.
26. Yassin, B.M., Zulkifli, R., Daud, W.R.W.& Abdullah, S. 2016 Flexural behaviour of uni-directional kenaf composites using experimental and simulation methods International Journal of Mechanical and Mechatronics Engineering. 16 (4) 57-64.
27. Rahman, S.N.A., Masdar, M.S., Rosli, M.I., Majlan, E.H., Husaini, T., Daud, W.R.W., Md Rejab, S.A. & Lye, C.C. 2016. Portable pem fuel cell system: Water and heat management Journal of Engineering Science and Technology 11:122-136.
28. Rosli, R.E., Sulong, A.B., Daud, W.R.W., Zulkifley, M.A., Rosli, M.I., Majlan, E.H.&Haque, MA.. 2016. Reactant control system for proton exchange membrane fuel cell. Procedia Engineering 148: 615-620.
29. Jaafar, S.N.H., Minggu, L.J., Ariffin, K., Kasssim, M.B. & Daud, W.R.W. 2016 Effect of using pitaya peel as dye-sensitizer and dye molecules in electrolyte for photoelectrochemical reaction. Malaysian Journal of Analytical Sciences 20 (3):651-659
30. Leong, J.X., Diño, W.A., Ahmad, A.. Daud, W.R.W. & Kasai, H. 2016. Morphology effect on proton

dynamics in Nafion® 117 and sulfonated polyether ether ketone. Journal of the Physical Society of Japan 85, 094803.

31. Soo, N.L.T.,Loh, K.S., Mohamad, A.B., Daud W.R.W., & Wong, W.Y. 2016. Synthesis of silver/nitrogen-doped reduced graphene oxide through a one-step thermal solid-state reaction for oxygen reduction in an alkaline medium. Journal of Power Sources324: 412-420.
32. Rahman, S.N.A., Masdar, M.S., Rosli, M.I., Majlan, E.H., Husaini, T., Kamarudin, S.K. &Daud, W.R.W. 2016. Overview biohydrogen technologies and application in fuel cell technology. Renewable and Sustainable Energy Reviews 66:137–162
33. Husin, M. A., Zulkifli, R., Abdullah, S., Wan Daud, W. R. 2015. Effect of NaOH Concentration on Mode II Critical Strain Energy Release, GIIC for Woven Mengkuang Fibre Reinforced Epoxy Laminated Composites. International Journal of Mechanical and Mechatronics Engineering 15(4): 26-31.
34. Husin, M.A., Zulkifli, R., Abdullah, S. & Daud, W.R.W. 2016.Kelakuan Delaminasi Komposit Laminat Hibrid Anyaman Gentian Mengkuang/ Gentian Asli Sutera/ Epoksi. Jurnal Teknologi.78 (6–9) 67–74.
35. Abdullah, S., Kamarudin, S.K., Hasran, U.A., Masdar, M.S. & Daud, W.R.W. 2016. Electrochemical kinetic and mass transfer model for direct ethanol alkaline fuel cell (DEAFC).Journal of Power Sources 320: 111-119.
36. Hakim, L., Yaakob, Z., Puspasari, I & Daud, W.R.W. 2016. Hydroxyapatite-supported tri-metallic catalyst for hydrogen production from steam reforming of glycerol. Jurnal Teknologi 78 (5):381–386.
37. Husin, M.A., Zulkifli, R., Abdullah, S. & Daud, W.R.W. 2016. Mode II delamination of woven mengkuang fiber/woven silk laminated hybrid composites. Materials Testing 58 (4),: 374-380
38. Toh, S.Y., Loh, K.S., Daud W.R.W. & Kamarudin, S.K. 2016. The impact of electrochemical reduction potentials on the electrocatalytic activity of graphene oxide toward the oxygen reduction reaction in an alkaline medium. Electrochimica Acta199:194–203.
39. Soo, N.L.T.,Loh, K.S., Daud W.R.W., Mohamad, A.B. & Wong, W.Y. 2016. Effect of nitrogen precursors on the electrochemical performance of nitrogen-doped reduced graphene oxide towards oxygen reduction reaction. Journal of Alloys and Compounds677:112-120.
40. Ghasemi, M., Daud, W.R.W., Alam, J., Jafari, Sedighi, M., Aljlil, S.A. & Ilbeygi, H.. 2015 Sulfonated poly ether ether ketone with different degree of sulphonation in microbial fuel cell: Application study and economical analysis International Journal of Hydrogen Energy41 (8): 4862-4871.
41. Ghasemi, M., Daud, W.R.W., Hassan, S.H.A., Jafary, T., Rahimnejad, M., Ahmad, A.&Yazdi, M.H. 2015 Carbon nanotube/polypyrrole nanocomposite as a novel cathode catalyst and proper alternative for Pt in microbial fuel cell. International Journal of Hydrogen Energy 41 (8):4872-4878
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43. Ghasemi, M., Daud, W.R.W., Alam, J., Ilbeygi, H., Sedighie, M., Ismail, A.F., Yazdi, M.H., Aljlili, S.A. 2016. Treatment of two different water resources in desalination and microbial fuel cell processes by poly sulfone/Sulfonated poly ether ether ketone hybrid membrane. Energy 96: 303-313

Year 2015:

44. Mokhtar, M., Talib, M.Z.M.,Majlan, E.H., Tasirin, S.M., Ramli, W.M.F.W., Daud, W.R.W. & Sahari, J. 2015. Recent developments in materials for aluminum-air batteries: a review. Journal of Industrial and Engineering Chemistry 32:1-20.
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b. Articles in Proceedings of International Conferences

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iv. Translated Books

1. Daud, W.R.W. (Translator) 1991. Pengenalan kepada Kendalian Pengeringan Secara Industri, Kuala Lumpur: Dewan Bahasa and Pustaka, 1991, translated from Keey, R. B. 1979. Introduction to Industrial Drying Operations, Oxford: Pergamom Press, 352 pp.
2. Daud, W.R.W., Salihon, J., Hamid, K.H.K., Abdullah, N. &Rahman, R.A. (Translators) 1994. Kejuruteraan Kimia : Rekabentuk, Vol. 6, Kuala Lumpur: Dewan Bahasa and Pustaka translated from Coulson, J. M. & Richardson, J. F. 1983, Chemical Engineering : Design, Vol. 6, Oxford: Pergamon Press, 971 pp..

v. Editing of Journals

1. Daud, W.R.W. (Guest Editor) Special Issue of International Journal of Hydrogen Energy Vol. 38 No. 22 for selected papers from The 3rd International Conference on Fuel Cells and Hydrogen Technology 2011.
2. Daud, W.R.W. (Chief Editor), Othman, M., Ali, M.A.M., Mohamed, A., Fauzi, M., Taha, M.R., Sahari, J., Zain, F.M., Abdullah, N. &Muhamad, N. 1999. Jurnal Kejuruteraan, Vol. 11(1), 80 pp.
3. Daud, W.R.W. (Chief Editor), Othman, M., Ali, M.A.M., Mohamed, A., Fauzi, M., Taha, M.R., Sahari, J., Zain, F.M., Abdullah, N. &Muhamad, N. 1999. Jurnal Kejuruteraan, Jld 11(2), 101 pp.
4. Daud, W.R.W. (Chief Editor), Othman, M., Ali, M.A.M., Mohamed, A., Fauzi, M., Taha, M.R., Sahari, J., Zain, F.M., Abdullah, N. &Muhamad, N. 2000. Jurnal Kejuruteraan, Vol. 12, 116 pp.
5. Daud, W.R.W. (Chief Editor), Othman, M., Ali, M.A.M., Mohamed, A., Fauzi, M., Taha, M.R., Sahari, J., Zain, F.M., Abdullah, N. &Muhamad, N. 2001. Jurnal Kejuruteraan, Vol. 13, 125 pp.

6. Daud, W.R.W. (Chief Editor), Othman, M., Ali, M.A.M., Mohamed, A., Fauzi, M., Taha, M.R., Sahari, J., Zain, F.M., Abdullah, N. &Muhamad, N. 2002. Jurnal Kejuruteraan, Vol. 14, 107 pp.
7. Daud, W.R.W. (Chief Editor), Darus, Z.M., Mohammad, A.W., Haron, C.H.C., Ismail, A., Samad, S.A., Abdullah, S., Rashid, Z.A.A., Rahmat, R.A.A., Anuar, N. & Ismail, H.. 2003 Jurnal Kejuruteraan, Vol. 15, 105 pp.
8. Daud, W.R.W. (Chief Editor), Darus, Z.M., Mohammad, A.W., Haron, C.H.C., Ismail, A., Samad, S.A., Abdullah, S., Rashid, Z.A.A., Rahmat, R.A.A., Anuar, N. & Ismail, H.. 2004. Jurnal Kejuruteraan, Vol. 16, 103 pp.
9. Daud, W.R.W. (Chief Editor), Saidi, H., Masitah Hassan, Tow, T.T., Rahman, R.A., Aziz, R.A.. 2003. Jurnal Jurutera Kimia Malaysia. Vol.. 3. 105 pp.

vi. Editing of National Conference Proceedings

1. Daud, W.R.W. (Chief Editor) &Sopian, K. (Editor), Kemajuan dalam Penyelidikan & Pengenmbangan Sel Bahan Api Malaysia (Advances in Malaysian Fuel Cell Research & Development), Admiral Cove, Port Dickson, 27 – 30 June 2003, 306 pp.
2. Daud, W.R.W. (Chief Editor), Mohammad, A.W., Tasirin, S.M.&Takriff, M.S. (Editors) 2000. SOMChE 2000, The Proceedings of the 14th Symposium of Malaysian Chemical Engineers, 743 pp.

3. EXCELLENCE IN ACADEMIC LEADERSHIP AND MANAGEMENT

4.1 Administrative Appointment inUKM:

- Director, Fuel Cell Institute, Universiti Kebangsaan Malaysia (2010-2011)
- Founding Director, Fuel Cell Institute, Universiti Kebangsaan Malaysia (2007-2009)
- Chief Editor, Jurnal Kejuruteraan, juornal of the Faculty of Engineering & Built Environment , UKM (1999–2004).
- Cooordinator, Master of Engineering program by courwork (Chemical Engineering) (2000-2006).
- Memberof Senate, Universiti Kebangsaan Malaysia (1998–2004).
- Deputy Dean, Faculty of nineering, Universiti Kebangsaan Malaysia (1990–1993), (1995–1998)
- Head, Department of Chemical & Process Engineering, Faculty of Engineering, Universiti Kebangsaan Malaysia (1984–1988)

4.2 Leadership in International Academic and Professional Societies

- Ex-Officio Immediate Past Chairman,Institution of Chemical Engineers, Malaysia Board 2010.
- Chairman, Institution of Chemical Engineers, Malaysia Board 2009.
- Deputy Chairman, Institution of Chemical Engineers, Malaysia Board 2008.
- Chairman, International Advisory Committee, 15th Regional Symposium on Chemical Engineering and the 22nd Symposium of Malaysian Chemical Engineers RSCE-SOMCHE 2008, 2-3 December 2008, Kuala Lumpur, Malaysia.

- Chairman, International Organising Committee, 2nd Asian Particle Technology Symposium (APT 2003) held on 17- 19 December 2003, Penang, Malaysia.
- Chairman, International Advisory Committee, 2nd Asia-Oceania Drying Conference (ADC'2001) 20 – 22 August 2001 in Penang, Malaysia

4. Public Service

5.1 Membership of International Academic and Professional Societies

- Member, American Chemical Society, Membership no. 30086954 (2009-)
- Fellow, Institution of Chemical Engineers, United Kingdom, Membership no. 249300 (2007-).
- Chartered Chemical Engineer at the Institution of Chemical Engineers, United Kingdom and The Engineering Council UK (Registration No: 564829) (2007-)
- Associate Member, Institution of Chemical Engineers, Membership no. 249300 (1999-2006)
- Fellow Islamic Academy, United Kingdom (1984-)

5.2 Membership in National Academic and Professional Societies

- Fellow of the Academy of Science Malaysia
- Professional Engneer registered with the Board of Engneers Malaysia, Registration No. : 8561 (Chemical Engineering) (1996 -)
- Corporate Member, Institution of Engineers Malaysia,Member No. 07766 (1996-)
- Founding Corporate Member, Institusi Jurutera Kimia Malaysia (1985-2006) (Noe the Malaysia Branch of the Institution of Chemical Engineers)
- Life Member, Akademi Sains Islam Malaysia (1986-).

5.3 Leadership in National Academic and Professional Societies

- President, Akademi Sains Islam Malaysia (2004-2010).
- Deputy President, Institusi Jurutera Kimia Malaysia (2004-2006).
- Chief Editor, Jurnal Jurutera Kimia Malaysia, jurnal the Institution of Chemical Engineers Malaysia (2000–2006).
- General Secretary, Akademi Sains Islam Malaysia (1997–2004)
- Committee Member, Akademi Sains Islam Malaysia (1995–1996)
- Memberof Council, Institusi Jurutera Kimia Malaysia (1993-2004)
- General Secretary,Akademi Sains Islam Malaysia (1991–1995)
- Committee Member, Akademi Sains Islam Malaysia (1986-1991) (1995–1996)

5.4 Leadership in National Committees

- Member, Examination & Qualification Committee, Board of Engineers Malaysia (2010-2012).
- Member, Examination & Qualification Committee, Board of Engineers Malaysia (2009-2010).
- Member of Evaluation Panel for the Engineering Accreditation Council,Board of Engineers Malaysia (2009-)
- Member, Steering Committee on Hydrogen, Solar Energy and Fuel Cells, Ministry of Energy, Water and Communication Malaysia, (now Ministry of Energy, Green Technologyand Water Malaysia)(2003-2005).
- Chairman, Subcommittee on Fuel Cells,Ministry of Energy, Water and Communication Malaysia, (now Ministry of Energy, Green Technologyand Water Malaysia)(2003-2005).
- Assessor for Chemical Engineering Programs at Board of Engineers Malaysia (2000-2007)
- Memberof Panel of Judges for the Intel's Science and Engineering Fair Malaysia Section 2000.
- Chairman ofTechniucal Committeeevaluating a project proposal on fuel cells under the Industrial Grant Scheme, Ministry of Science, technology and Enmvironment (now Ministry of Science, Technology and Innovations) (1998)
- Member Technical committee evaluating research and development project proposals on energy at the Ministry of Science, technology and Enmvironment (now Ministry of Science, Technology and Innovations) (1996-2000)
- Member Panel of Judges for the PETRONAS Inventor's Award (1992–1998).

5.5 Chemical Engineering Consulting Work

- Completed54chemical engineering consulting work on Quantitaive Risk Assessment of on-shore and off-shore oil and gas production installations, gas processing plants, gas pipelines, petrochemical plants, power stations and rail transport.
- Completed 6 environmental impact assessment of manufacturing plants, power stations and petrochemical plants.
- Completed 1 chemical engineering design project for extraction of waste heat from transformer coolers.

a. Quantitative Risk Assessment

1. Fisal, Z., Mohammad, A.B., Takriff, M.S., Daud, W.R.W. 2004. Environmental Impact Assessment : Guideline for Quantitative Risk Assessment for Department of Environment, Kementerian Sains, Teknologi & Inovasi.

2. Mohammad, A.B., Takriff, M.S., Fisal, Z., Daud, W.R.W. 2001. Environmental Impact Assessment: (Risk and Hazard Assessment) of Multiproduct Re-routing project, PS pipeline Sdn Bhd and Kumpulan Juruteknik Sdn Bhd.

3. Mohammad, A.B., Takriff, M.S., Fisal, Z., Daud, W.R.W. 2001. Environmental Impact Assessment: (Risk and Hazard Assessment) for the proposed Port Dickson lateral Pipeline, Petronas Gas Sdn. Bhd.

4. Mohammad, A.B., Takriff, M.S., Fisal, Z., Daud, W.R.W. 2001. Quantitative Risk and Hazard Assesment Study for Ethane Extraction Improvement Project of the Gas Processing Plant-4 in Kerteh, Terengganu, Petronas.

5. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 2000. Quantitative Risk and Hazard Assesment Study for Ethane Pipeline, Kerteh, Terengganu, Petronas.

6. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 2000. Quantitative Risk and Hazard Assesment Study for Tronoh Lateral Pipeleine Tronoh, Perak, Petronas.

7. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 2000. Quantitative Risk and Hazard Assesment Study for Propane-Butane Looping Pipeline, Petronas.

8. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 2000. Quantitative Risk and Hazard Assesment Study for Trans Thailand Malaysia Pipelines Pulau Pinang dan Kedah, Petronas.

9. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 2000. Supplementary Quantitative Risk and Hazard Assesment Study for Kerteh Centralised Tankage Facility Project at Kerteh, Terengganu, Petronas.

10. Mustafa, M.M., Fisal, Z., Rahman, R.A., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 2000. Environmental Impact Assesment including Quantitative Risk and Hazard Analysis of Drumming, Warehousing and Tank Truck Cleaning Facilitiea, in Kertih, Terengganu, and Kertih Terminals Snd. Bhd.

11. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 1999 Risk and Hazard Assessment of the Bulk Depot in Seberang Perai, Penang, Petronas Dagangan Sdn. Bhd.

12. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 1999 Environmental Impact Assessment: (Risk and Hazard Assessment) for the proposed LPG Bottling Plant, Petronas Dagangan Sdn Bhd.

13. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 1998 Risk and Hazard Assessment) for the proposed olefin derivatives, Optimal Sdn Bhd

14. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 1998 Risk and Hazard Assessment for the proposed Propane Dehydrogenation plant, Kuantan, Pahang, Petronas.

15. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 1998 Risk and Hazard Assessment for the proposed Ammonia plant, Kerteh, Terengganu, Petronas

16. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 1998 Risk and Hazard Assessment for the proposed Syngas Plant, Kerteh, Terengganu, Petronas

17. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 1998 Risk and Hazard Assessment for the proposed PGU Loop II pipeline, Petronas Gas Sdn Bhd.

18. Fisal, Z., Mohammad, A.B., Takriff, M.S. dan Daud, W.R.W., 1997 Risk and Hazard Assessment for the proposed MLNG 3 Plant, Bintulu Sarawak, MLNG Sdn Bhd

19. Fisal, Z., Daud, W.R.W., Takriff, M.S., and Tasirin, S.M.. 1998 Quantitative Risk and Hazard Analysis of Johor Port, Pasir Gudang, Johor, dan Johor Port Authority.

20. Fisal, Z., Daud, W.R.W., Takriff, M.S., and Tasirin, S.M.. 1997. Quantitative Risk and Hazard Analysis of the Proposed BASF OXO Plant in Gebeng, Pahang dan BASF (Malaysia) Bhd.

21. Fisal, Z., Daud, W.R.W., Takriff, M.S., and Tasirin, S.M., 1997 Quantitative Risk and Hazard Analysis of the Proposed BASF Propylene Dehydrogenation Plant in Gebeng, Pahang, dan BASF (Malaysia) Bhd.

22. Fisal, Z., Daud, W.R.W., Takriff, M.S., and Tasirin, S.M., 1997 Quantitative Risk and Hazard Analysis of the Proposed Second Ethylene Plant in Kerteh, Terengganu, dan Petronas.

23. Fisal, Z., Daud, W.R.W., Takriff, M.S., and Tasirin, S.M., 1997 Quantitative Risk and Hazard Analysis of the Proposed Central Tank Facilities in Kerteh, Terengganu, dan Petronas

24. Fisal, Z., Daud, W.R.W., Takriff, M.S., and Tasirin, S.M., 1997 Quantitative Risk and Hazard Analysis of the Proposed Central Utility Facilities in Kerteh, Terengganu, dan Petronas

25. Fisal, Z., Daud, W.R.W., Takriff, M.S., and Tasirin, S.M., 1997 Quantitative Risk and Hazard Analysis of the Proposed PGU Loop 2, dan Petronas Gas Malaysia Berhad

26. Daud, W.R.W., Fisal, Z., Shariff, M.A., Tasirin, S.M., Talib, M.Z.M., 1997. Quantitative Risk and Hazard Assessment of Resak/Beranang Development. for Petronas Research & Scientific Services and Carigali Sdn Bhd.

27. Daud, W.R.W., Fisal, Z., Shariff, M.A., Tasirin, S.M., Talib, M.Z.M., 1997. Quantitative Risk and Hazard Assessment of MASA/Anding Development. for Petronas Research & Scientific Services and Carigali Sdn Bhd

28. Fisal, Z., Daud, W.R.W., Talib, M.Z.M., Abu Bakar Mohamad, Mohd. Fauzi Jani, Yaakob, Z. 1996 Quantitative Risk and Hazard Analysis of the Proposed Acrylic Acid/Acetate Plant in Gebeng, Pahang, for Petronas & BASF (Malaysia) Sdn Bhd.

29. Fisal, Z., Daud, W.R.W., Talib, M.Z.M., Abu Bakar Mohamad, Mohd. Fauzi Jani, Yaakob, Z. 1996 Quantitative Risk and Hazard Analysis of the Proposed VCM/PVC Plant in Kerteh, Terengganu, for Petronas & Land & General Berhad.

30. Fisal, Z., Daud, W.R.W., Talib, M.Z.M., Mohd. Fauzi Jani, Tasirin, S.M. 1996 Quantitative Risk and Hazard Analysis of the Proposed Kerteh Refinery II in Kerteh, Terengganu, for Petronas Penapisan (Terengganu) Sdn Bhd.

31. Jailani Salihon, Daud, W.R.W., Fisal, Z., Talib, M.Z.M., Mohd. Rasid Yaakob, & Mohd Fauzi Mohd. Jani, 1995. EIA for ABF Proposed Methanol Plant, UF80 Plant, Methanol Pipeline and Ammonia Plant Upgrading Project at Bintulu Sarawak: Quantitative Risk and Hazard Analysis, for ASEAN Bintulu Fertiliser Sdn Bhd.

32. Daud, W.R.W., Fisal, Z., Jailani Salihon, Mohd. Rasid Yaakob, Asmah Ahmad, and Talib, M.Z.M.. 1995. Quantitative Risk and Hazard Analysis of the Proposed PGU Loop 1 Project, for PETRONAS Gas Sdn Bhd.

33. Sharifah Mastura, Hassan Basri, Mohamad, A.B., Daud, W.R.W., Mohd. Fauzi Mohd Jani, Rahman, R.A., Nordin Jamaluddin, Kamaruddin Abu Taib, Kamaruddin Md. Saleh, Jamaluddin Jahi, Abdul Halim Shamsuddi. 1995. Environmental Impact Assessment Including Quantitative Risk and Hazard Analysis of Regional Clinical Waste Incinerator, for Radicare (M) Sdn Bhd.

34. Daud, W.R.W., Fisal, Z., Jailani Salihon, Meor Zainal Mero Talib, Mohd. Rasid Yaakob, and Mohamad Ramlan Mohamad Saleh, Environmental Impact Assessment Study including Quantitative Risk and Hazard Analysis and Archeological Impact Assessment Study of the Proposed Multiproduct Pipeline Project, Vol. II, Quantitative Risk and Hazard Analysis Study, , PETRONAS/Shell JV.

35. Fisal, Z., Daud, W.R.W., Jailani Salihon, Mohd. Rasid Yaakob, Talib, M.Z.M.. 1995, Chapter 9, Environmental Impact Assessment Including Quantitative Risk and Hazard Analysis Study of the Proposed Segamat Compressor Station, for PETRONAS Gas Sdn Bhd..

36. Fisal, Z., Daud, W.R.W., Jailani Salihon, Mohd. Rasid Yaakob, Talib, M.Z.M.. 1995, Chapter 9, Environmental Impact Assessment Including Quantitative Risk and Hazard Analysis Study of the PETRONAS Proposed Ammonia/Urea and integrated Methanol/Formaldehyde Plant at Gurun, Kedah Darul Aman, for PETROLIAM NASIONAL BERHAD.

37. Fisal, Z., Daud, W.R.W., Jailani Salihon, Mohd. Rasid Yaakob, Talib, M.Z.M., Mohd. Fauzi Mohd Jani. 1995, Quantitative Risk and Hazard Analysis on Bintulu LPG Extraction Project, for PETROLIAM NASIONAL BERHAD.

38. Abdul Halim Shamsuddin, Fisal, Z., Abu Bakar Mohamad, Mohammad, A.B., Kamaruzzaman Sopian, Che Hassan Che Harun, Kamaruddin Abu Taib, Aziz Arshad, Daud, W.R.W., Asmah Ahmad, Mohd. Shamsuddin Zahid Sopian and Abdul Aziz Bidin 1994. Preliminary Environmental Impact Assessment Including Quantitative Risk and Hazard Analysis of Petronas Second Refinery Project Melaka: Supplementary EIA of PSR-2 Stage I, Universiti kebangsaan malysia and Petronas Penapisan (Melaka) Sdn. Bhd.

39. Jailani Salihon, Daud, W.R.W., Fisal, Z., Abu Bakar Mohamad, Che Hassan Che Haron, Mohammad, A.B., Mohd. Rasid Yaakob, Asmah Ahmad, Siti Rozaimah Shaikh Abdullah, Najib Mahmood Rafee, Amriah Buang, and Mohd. Shamsuddin Zahid Sopian, 1994. Environmental Impact Assessment Including Quantitative Risk and Hazard Analysis of the Proposed Liquefied Petroleum Gas Product Storage Tank at Kampung Tok Arun, Mukim Kuala Paka, Dungun, Terengganu Darul Iman, Vol. II: Quantitative Risk and Hazard Analysis, , OGP Technical Services Sdn Bhd, and Petronas Gas Sdn. Bhd.

40. Jailani Salihon, Daud, W.R.W., Fisal, Z., Abu Bakar Mohamad, Che Hassan Che Haron, Mohammad, A.B., Mohd. Rasid Yaakob, Asmah Ahmad, Siti Rozaimah Shaikh Abdullah, Najib Mahmood Rafee, Amriah Buang, and Mohd. Shamsuddin Zahid Sopian, 1994. Environmental Impact Assessment Including Quantitative Risk and Hazard Analysis of the Proposed Gas Processing Plants 5 & 6 at Kampung Tok Arun, Mukim Kuala Paka, Dungun, Terengganu Darul Iman, Vol. III: Quantitative Risk and Hazard Analysis, , OGP Technical Services Sdn Bhd, and Petronas Gas Sdn. Bhd.

41. Jailani Salihon, Daud, W.R.W., Fisal, Z., Abu Bakar Mohamad, Che Hassan Che Haron, Mohammad, A.B., Mohd. Rasid Yaakob, Asmah Ahmad, Siti Rozaimah Shaikh Abdullah, Najib Mahmood Rafee, Amriah Buang, and Mohd. Shamsuddin Zahid Sopian, 1994. Environmental Impact Assessment Including Quantitative Risk and Hazard Analysis of the Proposed Gas Processing Plants 5 & 6 Interconnecting Pipelines at Terengganu Darul Iman, Vol. II: Quantitative Risk and Hazard Analysis, , OGP Technical Services Sdn Bhd, and Petronas gas Sdn. Bhd.

42. Mustafa, M.M., Mazlan Othman, Pauzi Abdullah, Hassan Mat Nor, Zaidi Mohd. Isa, Kamaruzzaman Sopian, Masuri Othman, Shahbuddin Shaari, Kamaruddin Abu Taib and Daud, W.R.W., 1993. Environmental Impact Assessment including Quantitative Risk Assessment for Natural Gas Fuelled Power Station at Tg. Gemok, Port Dickson, and Sime Engineering for Port Dickson Power Sdn. Bhd.

43. Fisal, Z., Daud, W.R.W., Jailani Salihon, Abdul Wahab Muhammad, Mohamad, A.B., Che Hassan Che Haron, Normah Abdullah, Abdullah, A.R.S., and Mohd. Rasid Yaakob. November 1992. Quantitative Risk and Hazard Analysis for Gas Turbine Power Station, Port Dickson, and Sime Engineering Sdn. Bhd. for Port Dickson Power Sdn. Bhd.

44. Fisal, Z., Daud, W.R.W., Jailani Salihon and Abdul Wahab Muhammad. October 1993. Quantitative Risk and Hazard Analysis for Coal-Fired Power Station, Kuching, Sarawak, and MAB Environmental Consultant Sdn. Bhd. for Sarawak Electricity Supply Corporation.

45. Fisal, Z., Daud, W.R.W., Jailani Salihon, and Mohd. Rasid Yaakob, September 1993. Additional Quantitative Risk Analysis for Kertih Refinery Tankage Rationalisation Project, University Kebangsaan Malaysia for Petronas Penapisan (Terengganu) Sdn Bhd.

46. Daud, W.R.W., Fisal, Z., Jailani Salihon, Abdul Wahab Muhammad, Abdullah, A.R.S., and Mohd. Rasid Yaakob. October 1992. Environmental Impact Assessment Study including Quantitative Risk and Hazard Analysis on the Dew Point Control Unit - 2 (Addition to EIA of GPP4), Vol. II : Quantitative Risk and Hazard Analysis, for OGP Sdn. Bhd.

47. Daud, W.R.W. and Nordin Jamaluddin, June 1993. Supplementary Environmental Impact Assessment for the Proposed Lube Blending Facilities at Petronas Penapisan (Melaka) Sdn Bhd., Tangga Batu Melaka, for Petronas Penapisan (Melaka) Sdn Bhd.

48. Jailani Salihon, Abdul Rahim Md. Nor, Abdul Wahab Muhammad, Normah Abdullah, Mohd. Rasid Yaakob, Wan Ramli bin Wan Daud and Fisal, Z., 1992, Quantitative Risk and Hazard Analysis of GPP4 and Stage 2 Compressor Station, Vol. II, Environmental Impact Assessment of GPP4 and Stage 2 Compressor Station including Quantitative Risk and Hazard Analysis, untuk Petronas Gas (Malaysia) Sdn. Bhd., Kuala Lumpur, July 1992.

49. Jailani Salihon, Abdul Rahim Md. Nor, Abdul Wahab Muhammad, Normah Abdullah, Mohd. Rasid Yaakob, Wan Ramli bin Wan Daud and Fisal, Z., 1992, Quantitative Risk and Hazard Analysis of Stage 2 Compressor Station in Kuantan, Vol. II, Environmental Impact Assessment of Stage 2 Compressor Station in Kuantan including Quantitative Risk and Hazard Analysis, untuk Petronas Gas (Malaysia) Sdn. Bhd., Kuala Lumpur, July 1992.

50. Jailani Salihon, Abdullah Taib, Abdul Rahim Md. Nor, Abdul Wahab Muhammad, Normah Abdullah, Mohd. Rasid Yaakob, Wan Ramli bin Wan Daud and Fisal, Z., 1992, Quantitative Risk and Hazard Analysis of PGU III, Vol. II, Environmental Impact Assessment of PGUIII including Quantitative Risk and Hazard Analysis, for Petronas Gas (Malaysia) Sdn. Bhd., Kuala Lumpur, July 1992.

51. Jailani Salihon, Asmah Ahmad, Normah Abdullah, Mohd. Rasid Yaakob, Wan Ramli bin Wan Daud and Fisal, Z., 1992, Quantitative Risk Analysis for Kertih Refinery with Emphasis on Tankage Rationalisation Project, with for Petronas Penapisan (Terengganu) Sdn. Bhd., Kerteh, Terengganu, April 1992.

52. Jailani Salihon, Asmah Ahmad, Normah Abdullah, Mohd. Rasid Yaakob, Wan Ramli bin Wan Daud and Fisal, Z., 1992, Quantitative Risk Analysis for Debottlenecking of Kertih Refinery, with for Petronas Penapisan (Terengganu) Sdn. Bhd., Kerteh, Terengganu, July 1992.

53. Wan Ramli bin Wan Daud, Fisal, Z., Jailani Salihon, Asmah Ahmad and Abdul Rahim Md. Nor, 1990, Hazard Analysis and Quantitative Risk Assessment of the Proposed Cracker and Polyethylene Plants at Pasir Gudang Industrial Estate, KDI and for Titan Petrochemical (M) Sdn. Bhd. and Titan Polyethylene (M) Sdn. Bhd, Novewmber 1990.

54. Wan Ramli bin Wan Daud, Fisal, Z., Jailani Salihon and Asmah Ahmad, 1990, Quantitative Risk Assessment and Hazard Analysis of the Shell Bagan Luar Depot, for Shell Trading Malaysia Sdn. Bhd., August 1990.

b. Environmental Impact Assessment

1. Daud, W.R.W., 1995. Air Pollution Dispersion Study for the Proposed 2000 MW Power Station at Tanjung Batu, Perak Darul Ridzuan, Tenaga Nasional Research & Development Sdn Bhd.

2. Daud, W.R.W., 1995. Air Pollution Study in Prelimeniray EIA Study of the Proposed Aluminium Smelting Plant for Sumimetal Industries (M) Sdn Bhd on Lot 568 & 569 Kawasan Perindustrian Bukit Rambai, Daerah Melaka Tengah, Melaka, MAB Consultants.

3. Ahmad Badri Mohamad, et al (including Daud, W.R.W.), 1993. Preliminary Environmental Impact Assessment of the Proposed Coal-Fired Power Plant Project, Sejingkat, Kuching, Sarawak, MAB Environmental Consultant Sdn. Bhd. for Sarawak Electricity Supply Corporation.

4. Wong Yoke Fai, Noraini Mohd. Tamim, Asmah Ahmad, Ismail Mohd. Nor, Daud, W.R.W., Shaharuddin Ahmad, Abdul Rahim Mohd. Nor, Ngan Sik Yan and Khiri Pandak Saaid, 1991,Environmental Impact Assessment of the Proposed Industrial Estate and Housing Development at the Mukim Rasa, Daerah Ulu Selangor, with and Sepakat Setia Perunding Sdn Bhd for Perbaandan Kemajuan Negeri Selangor, June 1991.

5. Mazlan Othman, Abdul Rahim Md. Nor, Abdul Latiff Mohamed, Asmah Ahmad, G. W. H. Davidson, Hassan Basri, Syed Sheikh Almashoor, Wan Ramli bin Wan Daud, Zakaria Ismail, and Zakaria, Z., 1990,Environmental ImpactAssessment for the Proposed Cracker and Polyethylene Plants at Pasir Guandg Industrial Estate, KDI and for Titan Petrochemical (M) Sdn. Bhd. and Titan Polyethylene (M) Sdn. Bhd, July 1990.

6. Mohd. Ariffin Hj. Aton, Ramli Mohammad, Sharifah Mastura Syed Abdullah, Sanusi Jangi, Abdul Majid Mat Salleh, Ismail Mohd. Nor, Mazlan Othman, Noraini Mohd. Tamim, Sanusi Othman, G. W. H. Davidson, S. Awadala, Daud, W.R.W., 1989, Preliminary Environmental Impact Assessment: Proposed PETRONAS MTBE/Propylene and Polypropylene Plants and Associated Facilities, Kuantan Pahang, in Association with SWEC/Zainal Sdn. Bhd. for PETRONAS, Neste Oy and Idemitsu, December 1989.

a. Chemical Engineering Design

1. Daud, W.R.W., 1995. Waste Heat Extraction from Transformer Coolers, Idwal Engineers Sdn Bhd. for Tenaga Nasional Research & Development Sdn Bhd.

6. TEACHING AND SUPERVISION

6.1 Teaching

a. Post-Graduate Teaching

Courses Taught

- Computer Aided Chemical Process Design (2002-)
- Energy and the Environment (2000-)
- Air Pollutant Chemistry and Dispersion (1999-)
- Air Pollution Control (1999-)

b. Under-Graduate Teaching

Courses Taught:

- Transport Phenomena I (2007-2008)
- Separation Processes (2006-2007)
- Food Engineering (1999-)
- Chemical Process Principles (1999-)
- Technology and Civilization (1990-2006)
- Process Plant Design (1986-2006)

6.2 Supervision of Doctor of Philosophy & Master of ScienceStudents

Degree	Supervisor	Graduated	Ongoing	Withdrawn	Total	Overall Total
PhD	Main	35	11	14	60	86
	Co	12	17	-	29	
MSc	Main	31	4	9	44	63
	Co	11	10	-	21	
Total Post-Graduate Students Supervised		89	42	23	154	154
Total Under-Graduate Students Supervised		111	-	-	-	111

List of PhD Students' Thesis

No.	Period	Student	Title of Thesis	Supervisory role	Status of student
1	2016-	Ros Emilia Binti RosliSelfuel	Reka Bentuk dan Pengembangan Sistem Sel Fuel PEM Bersuhu Tinggi	Ahli J/K Penyeliaan	Sedang maju
2	2016	Siti Najibah Abd RahmanSelfuel	Reka Bentuk dan Pembangunan Penjana Kuasa Mudah Alih Sel Bahan Api	Ahli J/K Penyeliaan	Sedang maju
3	2016-	Raba'atun Adawiyah ShamsuddinSelfuel	Corrosion of Heat Treated Stainless Steel For Use As Base of Biocathode in Microbial Electrolysis Cell	Pengerusi J/K Penyeliaan	Sedang maju
4	2015-	Ibdal Satar	Sel mikrobial elektrolisis	Main Supervisor	Ongoing
5	2014-	Siti Mariam Bt. Daud Selfuel	Earthen Ware And Ceramic Membrane As A Separator In Microbial Fuel Cell	Chairman of Graduate Committee	Ongoing
6	2014-	Nur Fawwaz Binti Asri	Kajian Keberaliran Elektrik Plat Dwikutub Logam Untuk PEMFC Di Dalam Aplikasi Automotif	Member of Graduate Committee	Ongoing
7	2014-	Masniza Binti Mohamed @ Mahmood	Ekstraksi dan Penentuan Orthosiphon stamineus(OS) menggunakan hidropenyulingan yang dibantu Kesan Ohm	Main Supervisor	Ongoing
8	2014-	Lee Pak Hoe	Membran Penukar Proton Berasaskan Ko-polimer Berasaskan Polibenzimidaksole (Spbi) Bagi Aplikasi Sel Fuel For Fuel Cell Applications	Member of Graduate Committee	Ongoing
9	2013-	Syahir Bin Samsuddin	Sistem Kawalan bagi Kenderaan Sel Fuel	Member of Graduate Committee	Ongoing
10	2013-	Nasrin Binti Sulaiman	Sistem Pengurusan Tenaga bagi Kenderaan Sel Fuel	Member of Graduate Committee	Ongoing

11	2013-	Lim Bee Huah	Reka Bentuk, Simulasi, Pembikinan dan Penilaian Prestasi Stel Sel Fuel membran penukar proton 5 kW	Member of Graduate Committee	Ongoing
12	2013-	Nurhazira Azly Binti Minhat	Sel Fuel Mikrobial	Chairman of Graduate Committee	Withdrawn
13	2013-	Tahereh Jafari	A Novel Technology for Hydrogen Production From Organics Matters in a Microbial Electrolysis Cell (MEC)	Main Supervisor	Ongoing
14	2013-	Suhaila Binti Abdullah	Peningkatan Pembelahan Molekul Air Fotoelektrokimia Dengan Pewarna Semulajadi Daripada Buah Naga	Member of Graduate Committee	Ongoing
15	2013-	Fathie Binti Ahmad Zakil	Kajian Dinamik Sel Fuel Langsung Metanol	Co-Supervisor	Ongoing
16	2012-	Liew Kien Ben	Manganese oxide-carbon nanotubes nanocomposite as catalyst for oxygen reduction and POME treatment in microbial Fuel Cell	Chairman of Graduate Committee	Ongoing
17	2013-	Shiva Sadeghi Louyeh	Synthesis And Characterization Of Metal Coated Carbon Nanofiber For Hydrogen Storage	Co-Supervisor	Ongoing
18	2012-	Fathie Binti Ahmad Zakil	Dynamic studies of direct methanol fuel cell	Co-Supervisor	Ongoing
19	2012-	Suhaila Binti Abdullah	Synthesis and optimization of different type of fuel cells for different application	Member of Graduate Committee	Ongoing
20	2012-	Najua Delaila Binti Tumin	Kawalan Poliform Dan Penghabluran Asid Amino Dalam Pengering Sembur Skala Perintis	Main Supervisor	Ongoing
21	2012-	Toh Shaw Yong	Sintesis dan Pencirian Elektromangkin Berasaskan Grafena Baru bagi Aplikasi Sel Fuel Metanol Langsung	Co-Supervisor	Ongoing
22	2012-	Leong Jun Xing	Novel nano-composite speek membrane in microbial fuel cell for waste water treatment and continuous power generation	Chairman of Graduate Committee	Ongoing
23	2012-	Haslina Binti Ahmad	Elektrod hibrid untuk sel fuel metanol dengan bantuan cahaya	Member of Graduate Committee	Ongoing
24	2011-	Mohd Nashriq B. Nasharudin	Analisis of microfluidic fuel cells - modeling & simulation.	Co-Supervisor	Ongoing
25	2011-	Nabila Binti A. Karim	Mankin Cobalt Ftalodianina/karbon-Tungsten Pksida Nanowayar (W18O49) Untuk Katol Sel Fuel Metanol Langsung (DMFC)	Co-Supervisor	Ongoing
26	2011-	Norhafiz Bin Hashim	Rekabentuk, fabrikasi dan pengoptimuman sel fuel metanol langsung	Co-Supervisor	Ongoing
27	2011-	Azlyana Binti Ismail	Synthesis and Optimisation of Direct Methanol Fuel Cells via Cell Network	Co-Supervisor	Ongoing
28	2011-	Dang Sri Ayu Binti Abdul Halim	Biofilem dalam anod sel fuel mikrobial	Main Supervisor	Ongoing
29	2010-	Azran Bin Mohd Zainoodin	Lapisan Berliang Nanogentian Karbonuntuk Sokongan Elektrod Anod	Member of Graduate	Ongoing

			Dalam Sel Fuel Metanol Langsung Pasif	Committee	
30	2010 – 2013	Wong Wai Yin	Sintesis dan Pencirian Nanotiub Karbon Terdop Nitrogen Sebagai Mangkin Katod untuk Aplikasi Sel Fuel	Main Supervisor	Finished
31	2010 - 2013	Thiam Hui San	Membran Nanokomposit Nafion/SiO_2-Pd untuk Aplikasi Sel Fuel Metanol Langsung	Main Supervisor	Finished
32	2010-2015	Sahriah Binti Basri	Pembangunan Mangkin Berstuktur Nano Untuk Sel Fuel Metanol Langsung	Co-Supervisor	Finished
33	2010-2014	Dedi Rohendi	Pembangunan Himpunan Elektrod Membran Ketumpatan Arus Tinggi untuk PEMFC Mudah Alih	Co-Supervisor	Finished
34	2010-2015	Nurul Fitriah Binti Nasir	Pemodelan dan Pengoptimuman Proses Biodiesel Selanjar dan Sesekumpul Menggunakan Mangkin Homogen dan Heterogen	Main Supervisor	Finished
35	2009 - 2013	Mulyazmi	Pengembangan Metodologi Reka Bentuk Proses Sistem Sel Fuel Membran Penukaran Proton Untuk Pencapaian Prestasi Optimum	Main Supervisor	Finished
36	2009 - 2014	Erni Misran	Pemodelan dan Simulasi Pemindahan Air Di Sepanjang Alur Aliran Gas Sel Fuel Membran Penukar Proton	Main Supervisor	Finished
37	2009 - 2014	Asma M Husin Milad	Photocurrent Enhancement of Titania Nanotubular Arrays By Doped and Hetero Nanocomposite With Non Metal and Metal Oxide For Photoelectrochemical Water Splitting	Main Supervisor	Finished
38	2009– 2009	Majid Talebi Esfandarani	Photoelectrochemical cell for hydrogen production	Main Supervisor	Withdrawn
39	2009 - 2013	Samaneh Keshani	Deposition of Sugar, Fat and Protein-Rich Food Materials in Pilot Scale Spray Drye	Main Supervisor	Finished
40	2009 - 2010	Soo Chan Wai	Producing hydogen gas from salt water through radiofrequency	Co-Supervisor	Withdrawn
41	2008 – 2012	Nader Mokhtarian Mohammad Sadegh	Microbial Fuel Cells Development for Detection of Electrochemical Potential and Low Voltage Electricity	Main Supervisor	Finished
42	2008-2009	Mohd Shaiful Ramze Bin Endut	Crystallization Process of Pharmaceuticals and Macromolecules (Protein)	Main Supervisor	Withdrawn
43	2008 – 2012	Ifa Puspasari	Hydrodynamic and Drying Characteristics of Oil Palm Frond Particles in An Agitated Fluidized Bed Dryer	Main Supervisor	Finished
44	2008 - 2013	Dedikarni Bin Panuh	Penyediaan dan Pencirian Sel Butang Tunggal Elektrolit Dwi Lapisan $Sm_{0.2}Ce_{0.8}I_{1.90}$(SDC)/$Y_{0.25}Bi_{0.75}O_{1.5}$(YSB) Bagi Sel Fuel Oksida Pepejal Bersuhu Sederhana dan Rendah	Co-Supervisor	Finished
45	2008 - 2012	Khuzaimah Arifin	Kompleks Dwilogam Rutenium - Tungsten Sebagai Bahan Pemeka Pewarna Bagi Sel Fotoelektrokimia Pembelahan Molekul Air.	Co-Supervisor	Finished

46	2008 – 2010	Fadhli Hadana Rahman	Fotoelektral Untuk Penghasilan Hidrogen	Co-Supervisor	Withdrawn
47	2008 - 2012	Jarot Raharjo	Sintesis dan Pencirian Elektrolit $Ce_{0.8}Sm_{0.2}O_{2-\delta}(Li/Na)_2CO_3$ Dengan Kaedah Pensinteran Tanda Tekanan Untuk Sel Fuel Oksida Pepejal Bersuhu Sederhana.	Main Supervisor	Finished
48	2006-2010	Mustafa I Fadhel	Studies on a Solar Assisted Chemical Heat Pump Dryer	Co-Supervisor	Finished
49	2006-2010	Mohammad Ahmad Najib Batiha	Modelling The Environmental Fate and Impact of Non-Volatile Organic Agro-Chemicals	Co-Supervisor	Finished
50	2006–2009	Mariam Firdhaus Binti Mad Nordin	Microwave-Assisted Drying of Pitaya (Hylocereus) Slices	Main Supervisor	Finished
51	2006-2009	Woo Meng Wai	Product Deposit Reduction in Spray Dryers	Main Supervisor	Finished
52	2006 – 2014	Umi Azmah Asran	Pembangunan Sel Fuel etanol Langsung (DMFC) Mikro dengan Teknologi Sistem Mikro-Elektro-Mekanikal (MEMS)	Main Supervisor	Finished
53	2006-2012	Lorna Binti Jeffery Minggu	Pembelahan Air Fotoelektrokimia dengan Semikonduktor Oksida Logam dalam Sistem Fotoreaktor	Main Supervisor	Finished
54	2004-2010	Mahreni Akhmad	Sintesis dan Penggunaan Membran Komposit Sebagai Elekrolit Sel Fuel Membran Penukar Proton	Co-Supervisor	Finished
55	2004-2007	Yusri bin Yusup	Struktur Lapisan Permukaan Atmosfera di Kawasan Perinudtrian Khatulistiwa	Main Supervisor	Finished
56	2004-2008	Rosnah Bt Shamsudin	Sifat-Sifat Fizikal-Kimia, Terma, Mekanikal dan Reologi *Ananas Comosus I* (Varieti Josaphine)	Main Supervisor	Finished
57	2004-2010	Tjukup Marnoto	Reka Bentuk, Operasi Dan Kawalan Untuk Sistem Tenaga Hidrogen Suria Tersambung Grid	Main Supervisor	Finished
58	2004 – 2012	Nornizar Bt Anuar	Behaviour of Aqeous Solution, Crystallisation and Characterisation of L-isoleucine.	Main Supervisor	Finished
59	2004–2009	Shahnaz Mansouri Jajaei	Extraction of Essential Oils From Herbs using Supercricital Fluid Method	Main Supervisor	Finished
60	2004–2009	Soraya Hosseini	Synthesis of Proton Conductive Membrane Using Cesium Dipjosphate Nanoparticles for the Fabrication of Membrane Eelctrode Assembly for Fuel Cells	Co-Supervisor	Finished
61	2002 - 2005	Ramli Sitanggang	Pembuatan Himpunan Elektrod Membran Sel Bahan Api Menggunakan Kaedah Semburan	Co-Supervisor	Finished
62	2002–2003	Haider O Mahmood Al-Mahdi	Optimization of MEA Coating Process By Screen Printing	Main Supervisor	Withdrawn
63	2002-2010	T.Husaini	Membran Reaktor Penghasilan Gas Hidrogen.	Main Supervisor	Finished
64	2002-2005	Siti Kartom Bt Kamarudin	Sintesis Proses dan Reka Bentuk Optimum Untuk Rangkaian Reaktor-	Main Supervisor	Finished

			Pemisah Menggunakan Kaedah Algoritma		
65	2002-2005	M. Rusli Yosfiah	Model Kinetik dan Pengoptimuman Penghasilan Gas Hidrogen Daripada Metanol dengan Menggunakan Mangkin Ni, Cu, Mo/Gamma Al_2O_3	Main Supervisor	Finished
66	2001-2004	Muhammad Yahya	Sistem Penyahlembapan Terbantu Suria untuk Herba Perubatan	Co-Supervisor	Finished
67	2002 – 2007	Edy Herianto	Penulenan Gas Hidrogen Menggunakan Sistem Jerapan Buaian Tekanan Terpadat Untuk Sel Bahn Api	Main Supervisor	Finished
68	1999-2003	Bambang Trisakti	Pengeringan Terpilih Serbuk	Main Supervisor	Withdrawn
69	1999-2003	Rosdanelli Hasibuan	Pengeringan Gentian Tandan Kosong Kelapa Sawit Menggunakan Sistem Pengerigan Telus Stim Panas Lampau	Main Supervisor	Finished
70	1999–2002	Yeoh Hak Koon	Kajian Fotoelektrod Tersensitasi Pewarna Untuk Pengeluaran Hidrogen Melalui Fotoelektrolisis-tidak-terbantu Air	Main Supervisor	Withdrawn
71	1999-2003	Law Chung Lim	Pembendaliran: Hidrodinamik dan Penggunaannya dalam Proses Pengeringan	Main Supervisor	Finished
72	1998-2002	Muhammad Turmuzi	Pembuatan Karbon Teraktif dan Karbon Penapis Molekul daripada Tempurung Buah Keras	Main Supervisor	Finished
73	1998-2002	Taslim	Fenomena Pengangkutan Aliran Berayun dalam Turus Bersesekat	Co-Supervisor	Finished
74	1997-2001	Ye Lwin @ Mohammed Husein	Characterization of Cu-Al Hydrotalcite-Derived Mixed Oxide for Hydrogen Productionby Steam-Methanol Reforming	Main Supervisor	Finished
75	1997-2000	Supranto	Reka Bentuk dan Penilaian Sistem Pengeringan Terbantu Suria Dua Laluan dengan Media Berliang	Main Supervisor	Finished
76	1997-2002	Widayanti	Fenomena Pengelutan Zarahdari Turus Lapisan Terbendalir	Co-Supervisor	Finished
77	1997-1998	Gunarto	Pemodelan Matematik Sistem Penjerapan Buaian Suhu	Main Supervisor	Withdrawn
78	1996-2002	Meor Zainal Bin Meor Talib	Pemodelan dan Simulasi untuk Sel Bahan Api bermembran Elektrolit Polimer	Main Supervisor	Finished
79	1996-2001	Tin Mar Kyi	Drying with Chemical Reaction in Cocoa Bean Drying	Main Supervisor	Finished
80	1996-1996	Muhammad Niazul Haque Sarker	Design of Proton Exchange Membrane Fuel Cell Stack	Main Supervisor	Withdrawn
81	1996-1996	Khaled El-Alem	Heat Transfer in Proton Exchange Membrane Fuel Cell	Main Supervisor	Withdrawn
82	1996-1996	Abdul Salam Uheida	Novel Gas Diffusion Electrode for Proton Exchange Membrane Fuel Cell	Main Supervisor	Withdrawn
83	1995-	Sunny Iyuke	Pressure Swing Adsorption of	Main	Finished

	1999	Esayegbemu	Hydrogen	Supervisor	
84	1992-1996	Sam Myint	Extraction of Eugenol from clove	Main Supervisor	Finished
85	1989-1994	Mahamad Hakimi Ibrahim	Drying of Oil Palm Kernels	Main Supervisor	Finished
86	1988-1990	Ibrahim Shouib	Numerical Simulation of a Rotating Boiler	Main Supervisor	Withdrawn

List of MSc Students' Thesis

No.	Period	Student	Title of Thesis	Supervisory role	Status of student
1	2016	Ahmad Tajuddin Bin Abdullah	Sel Fuel Membran Penukaran Proton (Pemfc) Sistem Penyejukan Air	Member of Graduate Committee	Ongoing
2	2016	Shuaiba Binti Samad	Mangkin DMFC	Co-Supervisor	Ongoing
3	2015	Mohd Azri Ahmad	Stainless steel electrode for MFC	Main Supervisor	Ongoing
4	2014-	Siti Mariam Bt. Daud Selfuel	Screening Of Earthen Ware And Ceramic Membrane As A Separator In Microbial Fuel Cell	Chairman of Graduate Committee	Ongoing
5	2014-	Nurul I`Zzati Binti Baharul Wafi	Development Of Lithium Ion Phosphate Battery Based On Immobilization Of Lithium Iron Phosphate Into Poly(2-Hydroxylethyl Methacrylate) As A Gel Electrolyte	Co-Supervisor	Ongoing
6	2014-	Badrullzamin Bin Mohd Yassin	Mengkuang Composite for car bodies	Co-Supervisor	Ongoing
7	2013-	Mohd Azwan Bin Husin	Penggunaan bahan eco-komposit (komposit diperkuat gentian mengkuang)untuk komponen badan kereta sel fuel.	Member of Graduate Committee	Ongoing
8	2013-	Muhamad Norfais Bin Faisal	Converter And Control Design For Fuel Cell Hybrid Electric Vehicle Application	Co-Supervisor	Ongoing
9	2013-	Joy Liew Wei Yi	Membran Polimer Elektrolit Berasaskan K-Karagenan dan K-Karageenan Terfosforil Untuk Aplikasi Sel Fuel	Co-Supervisor	Ongoing
10	2013-	Soo Li Ting	Sintesis dan Pencirian Elektromangkin Berasaskan Logam Peralihan dan Nitrogen Didopkan Grafin Untuk Tindak Balas Penurunan Oksigen	Member of Graduate Committee	Ongoing
11	2013-	Norsyaidatul Binti Ibrahim	Production of Biomethanol from Photoelectrochemical reaction of Biomass	Member of Graduate Committee	Ongoing
12	2012-	Mumtazah Atiqah Binti Hassan	Development of sensor in DMFC	Chairman of Graduate Committee	Tukar ke PhD
13	2012-	Leong Jun	Novel nano-composite speek	Main	Finished

		Xing	membrane in microbial fuel cell for waste water treatment and continuous power generation	Supervisor	
14	2012-2014	Liew Kien Ben	Manganese oxide-carbon nanotubes nanocomposite as catalyst for oxygen reduction and POME treatment in microbial Fuel Cell	Main Supervisor	Ongoing
15	2011-2015	Mohd Zul Fadli Kamaruddin	Pembangunan Tangki Simpanan Pasif untuk Sel Fuel Metanol Langsung Pasif	Main Supervisor	Finished
16	2010 -2015	Siti Afiqah Binti Abd Hamid	Reka Bentuk Dan Pembangunan Sistem Pengurusan Kuasa Hibrid Sel Fuel, Superkapasitor, Dan Bateri Untuk Aplikasi Kenderaan	Main Supervisor	Finished
17	2010 -2014	Ros Emilia Binti Rosli	Pembangunan Sistem Kawalan Hidrogen untuk Stek PEMFC	Co-Supervisor	Finished
18	2009 –2012	Miftah Kurniawan	Kesan Tekanan Pemasangan Stek Terhadap Prestasi Sel Fuel Membrane Penukaran Proton.	Co-Supervisor	Finished
19	2008 - 2009	Sahriah Binti Basri	Pembangunan Peranti Reka Bentuk Untuk Sel Fuel Metanol Langsung	Co-Supervisor	Withdrawn
20	2008 – 2010	Mismisuraya Bt Meor Ahmad	Pembangunan Sel Fuel Metanol Langsung Untuk Kegunaan Mudah Alih	Co-Supervisor	Finished
21	2008 - 2010	Muhammad Shahid	Simulation of Complete Fuel Cell Systems	Main Supervisor	Finished
22	2008 - 2010	Norhafiz B Hashim	Rekabentuk Dan Fabrikasi Sel Fuel Mikro Metanol Langsung.	Co-Supervisor	Finished
23	2008 –2011	Lim Swee Su	Pengoptimuman Penghasilan Kuasa elektrik Dari Sel Fuel Mikrob (SFM) Berasaskan Kultur Campuran Dan Kultur Tunggal.	Co-Supervisor	Finished
24	2008-2010	Haslina Binti Ahmad	Membran Hibrid Nafion/Polibenzimidazol /Zirkonium Fosfat untuk Aplikasi SFML	Co-Supervisor	Withdrawn
25	2008 –2010	Achmad Fauzie	Pembangunan Sel Fuel Metanol Langsung Sebagai Pengecas Telefon Mudah Alih.	Main Supervisor	Finished
26	2008 –2010	Nanda Sastaviana	Solid oxide fuel cell (SOFC)	Co-Supervisor	Withdrawn
27	2007 - 2009	Noorashrina Binti A Hamid	Pembangunan Katod $La_{1-x}Sr_xCo_{0.2}Fe_{0.8}O_3$(LSCF) Bagi Sel Fuel Oksida Pejal Bersuhu Sederhana (IT-SOFC)	Main Supervisor	Finished
28	2004 – 2005	Wong Kuek Keong	CFD simulation of separtion	Main Supervisor	Finished
29	2004 - 2007	Shuhaida Binti Harun	Pembanhunan Sistem Penasihat Reka Bentuk Untuk Reka Bentuk Konsep Loji dan Proses Kimia	Co-Supervisor	Finished
30	2003 – 2005	Nor Roslina Binti Rosli	Pengekstrakan Minyak Serai Wangi (Cympogonna Nardus) Secara Pengekstrakan Bendalir Lampau Genting	Co-Supervisor	Finished
31	2003 - 2006	Khuzaimah Arifin	Sintesis Organik,Pencirian dan Kestabilan Foto Kompleks	Co-Supervisor	Finished

			Tris(Diotelena) Tunsten		
32	2003-2006	Fadhli Hadana Rahman	Sintesis Takorganik Kompleks Tris(Diotelena) Tunsten Sebagai Ftomangkin Bagi Fotolisis Air	Co-Supervisor	Finished
33	2003-2006	Navriani Harahap	Kesan Tekanan Dalam Pengoptimuman Suhu Ke Atas Pembikinan Himpunan Elektrod Membran	Main Supervisor	Finished
34	2002 - 2004	Zahiruddin Bin Mohamed	Kesan Suhu Tinggi ke Atas Hidrodinamik Pembendaliran dan Pengirigan Zarah Dalam Lapisan Terbendalir	Main Supervisor	Finished
35	2002 - 2005	Elradi Adam Musa	Heat Transfer in Proton Exchange Membrane Fuel Cell	Main Supervisor	Finished
36	2002 - 2004	Azman Yazid	Reka Bentuk Konsep Sistem Sel Bahan Api Eelektrolit Polimer dengan Modul Membran Seramik Menggunakan Perisisan Simulasi Proses HYSYS	Main Supervisor	Finished
37	2002 - 2004	Loke Yan Kai	Reka Bentuk Sistem Sel Bahan Api Jenis Membran Elekrolit Polimer Dengan Perisisan Simulasi HYSYS	Co-Supervisor	Finished
38	2002 - 2004	Masli Irwan Bin Rosli	Prestasi Sel Bahan Api Membran Pertukaran Proton - Pemilihan Reka Bentuk Plat Laluan	Main Supervisor	Finished
39	2002 - 2004	Mimi Hani Binti Abu Bakar	Proses Penyediaan Mangkin Platinum di atas Substrat Karbon Teraktif Tempatan Menggunakan Teknik Isitepu	Main Supervisor	Finished
40	2002 - 2003	Mohd Shahbudin Bin Mastar @Masdar	Pembangunan Model Matematik dan Kajian Parameter Sel Bahan Api Membran Elektrolit Polimer	Co-Supervisor	Finished
41	2002 - 2004	Nik Suhaimi Bin Mat Hassan	Pembangunan Model Matematik bagi Pemindahan Jisim Air dalam Sel Bahan Api Membran Elektrolit Polimer	Main Supervisor	Withdrawn
42	2002 - 2004	Mustafa I Fadhil	Solar Hydrogen Production System	Co-Supervisor	Finished
43	2002 – 2005	Vickneswaran S/O M.Veloo	Optimization of Batch Drilling Fluids/Mud Mixing Plant	Main Supervisor	Finished
44	2002 - 2004	Souiyah Miloud	Performance of Proton Exchange Membrane Fuel Cell with Interdigitated Flowfield	Co-Supervisor	Finished
45	2002 - 2004	Ng Pin Pin	Pengerigan Padi dalam Lapisan Terpancut	Co-Supervisor	Finished
46	2001 - 2004	Lorna Binti Jeffery Minggu	Penghasilan Hidrogen Daripada Pembentukan Semula Metanol	Main Supervisor	Finished
47	2001 - 2003	Mohd Sabri Bin Mahmud	Penyediaan dan Pencirian Mangkin Cu-Zn-V-Al Dalam Pembentukan Semula Autoterma Metanol	Main Supervisor	Withdrawn
48	2000 - 2002	Mohd Nahar Bin Othman	Pemusnahan Benzena (Bahan Organik Mudah Meruap) Menggunakan Kaedah Alur Elektron	Main Supervisor	Finished
49	2000 – 2002	Abdol Salam Bin Ns Mohd Sariff	Pengoptimuman Proses Loji Pemprosesan Gas	Main Supervisor	Finished
50	1999-2002	Eman Noori Ali	Sampling and Analysis of Volatile	Main	Finished

			Organic Compounds in Ambient Air in Malaysia	Supervisor	
51	1999 - 2002	T.Husaini	Penyampelan dan Analisa Statistik Sebatian Organik Meruap di Kawasan Lembah Kelang	Co-Supervisor	Finished
52	1999 - 2001	Islina Binti Kamaruzaman	Keseimbangan Jerapan Alkana-alkana Berberat Molekul Rendah Ke Atas Karbon Teraktif dan Penapis-Penapis Molekul	Main Supervisor	Finished
53	1998 - 2000	Law Chung Lim	Pengiringan Bagi Zarah Halus Dari Pengelut Terbendalir Sesekumpul	Main Supervisor	Finished
54	1999 - 2002	Norliza Binti Abd Rahman	Penalaan Pengawal Lazim PID ke Atas Menara Penyulingan Dengan Kaedah Logik Kabur	Main Supervisor	Finished
55	1998 - 2000	Edy Herianto	Penjerapan Sebatian Organik Mudah Meruap Menggunakan Sistem Jerapan Buaiaan Terma	Main Supervisor	Finished
56	1998 - 2000	Chebbi Rachid	Fabrication of Low Platinum Loading Elektrode for Proton Exchange Membrane Fuel Cell System	Main Supervisor	Withdrawn
57	1998 - 2000	Ma'an Fahmi Rashid Al Khatib	Surface Modification of Activated Carbon by Impregnation with $SnCl_2.H_2O$ for for Purification of H_2/CO Gas Mixture	Co-Supervisor	Finished
58	1997-1997	Loo Yong Eng	Pencirian Elektrodialiser	Main Supervisor	Finished
59	1997-2000	Monsurah Begum	Preparation and Characterisation of Cu-Al Catalysts for Steam-Methanol Reforming Reaction	Main Supervisor	Withdrawn
60	1996-1998	Fathi Abdul Aziz Messaud	Characterisation of Asahi Membrane using X-ray Photoelectron Spectroscopy	Main Supervisor	Finished
61	1996-1996	Ahmad Sadik Hassan	Electrode Catalyst for Methanol Conversion to Hydrogen	Main Supervisor	Finished
62	1995-1997	Muhammad Hazza Rasheed	Characterization of Solid Polymer Electrolytic Membrane Nafion117 by X-Ray Photoelectron Spectsrocopy	Main Supervisor	Finished
63	1993-1996	Muhammad Niazul Haque Sarker	Drying Characteristics of Paddy	Main Supervisor	Finished
64	1990-1994	Meor Zainal Bin Meor Talib	Ciri-ciri Pengeringan Biji Koko	Main Supervisor	Finished
65	1986-1987	Zakaria Omar	Pengeringan Biji Sawit	Main Supervisor	Withdrawn

List of Undergraduate Students' Thesis

No.	Year	Nam3	Title
1	2016	Norsyafika Binti Hassim	Permodelan Dan Simulasi Mikrobial Sel Fuel Untuk Penghasilan Kuasa Elektrik
2	2016	Nur Amera Binti Mohamad Bakri	Permodelan dan simulasi sel mikrobil elektrolisis
3	2015	Ying Ying Ch'ng	Sintesis membrane komposit baru bagi kegunaan sel fuel

4	2015	Fatimah Azzahra	Sintesis membrane komposit baru bagi kegunaan sel fuel
5	2014	Nurul Nadia Nga	Penyediaan, Pencirian Dan Pengujian Fotoelektrod Bagi Bateri Boleh Cas Semula
6	2014	Noor Zaiyan Misyan	Tindak balas fotokatalisis efluen kilang minyak sawit (POME) bagi penghasilan hidrogen hijau
7	2013	Tan Eng Lee	Membran polimer elektrolit berasaskan blok kopolimer untuk aplikasi sel fuel.
8	2013	Dahiyah Binti Mohd Fadzillah	Komposit membran asid pepejal untuk sel fuel bersuhu perantaraan
9	2012	Mohd Kamaruzzaman Bin Mat Daud	Penganggaran Pekali Serapan Air yang Boleh-ubah daripada Data Kadar Pengeringan
10	2012	Normalayati Binti Mahmad Raseh	Keterpilihan dan Ruang Pecapaian Metil Ester dan Gliserol dalam Tindak Balas Trans-Esterifikasi Pelbagai Minyak Makan danTak Boleh Dimakan bagi Menghasilkan Biodiesel
11	2011	Norbaini Binti Bahtiar	Penentuan Saiz (Luas Permukaan) Membran dan Masa Proses bagi Modul Osmosis Terbalik Beraliran Silang yang Berkitar Semula
12	2011	Mohamad Zulhairi Bin Ibrahim	Pemodelan dan Simulasi Rangkaian Kuasa Kereta Bugi Golf yang Dipacu Sel Fuel
13	2010	Lee Seet Yee	Pemerangkapan Karbon Menggunakan Penjerapan Ke Atas Kapur
14	2010	Farhan Bin Mohd Pozi	Simulasi Aliran dalam Sel Fuel menggunakan CFD
15	2008	Ong Hee Hwee	Pengeringan Cip Gentian Pelepah Sawit dengan Pengering Lapisan Terbendalir Bergetar
16	2008	Mary Khoo	Pelembap Udara Membran bagi Sistem Sel bahan Api
17	2007	Awis bin Zakaria	Permodelan dan Simulasi loji Proses Kimia
18	2007	Yeap Kim Gaik	Pengeringan Sumber Ekstraksi The
19	2007	Chua Ynyen A	Ekstraksi Lampau Genting Likopena daripada Pulpa Jambu Batu Merah Buangan
20	2006	Wong Wai San	Pengeringan Buah Jambu Kampuchea (psidium guajava) dalam Kebuk Pengeringan
21	2006	Ong Chin Hooi	Pengeringan Stim Gentian Kenaf
22	2006	The Shu Yi	Pengeringan Hirisan Buah Mangga dalam Kebuk Pengeringan
23	2005	Awis Bin Zakaria	Pemodelan dan Simulasi Dinamik Loji Proses
24	2005	Fara Fazreena Binti Zulkifli	Penghasilan Zarah Nano Dengan Menggunakan Proses Anti Pelarut Supergenting
25	2005	Chin Sui Kem	Pengeringan Berbagai Herba
26	2005	YeoThian Soon	Pengeringan Cili dengan Lapisan Terpancut
27	2005	Khoo Boon Ken	Alat Nauta Mixer sebagai Alat Penggalak Aliran
28	2004	Mohd Fadzly Bin Ariffin	Penghasilan komputer untuk penghasilan bentuk modul membran ultraturasan dan osmosis terbalik
29	2004	Zarirah Binti Mohamad Yusof	Pengeringan ekstrak herba Andrographis
30	2004	Chan Chee Wai	Pengeringan Herba Andrographis
31	2003	Aliza Binti Surip	Pemodelan dan penyelakuan pengangkutan jisim dan haba utk biji koko menggunakan pendekatan multi fizik
32	2003	Naimatul Fitriyah Binti Mohamad	Pengeringan Produk Tanah liat

33	2003	Norhaslina Binti Mohd Sidek	Susuk suhu pepejal suhubebuli kering suhu bebuli basah kelembapan udara dan kandungan lembapan pepejal di dalam pengeringan lapisan terbendalir aliran silang
34	2003	Eng Kok Hoe	Pengeringan Sembur Susu Soya
35	2003	Low Ee Mee	Kembangan sistem pemisahan H2/CO2 dengan membran paladium
36	2002	Shafiza Binti Zakaria	Reka Bentuk Konsep Sistem Sel Bahanapi
37	2002	Zarin B Zid	Proses Pembentukan Zarah Gelatin dan Pengeringannya
38	2002	Cheah Hui Ming	Pengeringan Beras Pulut Di dalam Turus Terbendalir Bagi Aplikasi Industri
39	2002	Farmasuhaini Binti Mohd	Pengeringan Stim Beras
40	2002	Mohd Asmawi Syahrulnizam Bin Mohd	Pengeringan Beberapa Bahan Berkabohidrat
41	2002	Mohd Shohib Bin Talib	Pengoptimuman Proses Ssesekumpul
42	2002	Cheah Hui Ming	Pengeringan Beras Pulut
43	2001	Mohd Asmawi Syahrulnizam B Mohd	Pengeringan Gelatin
44	2001	Nik Suhaimi Bin Mat Hassan	Pengoptimuman Proses Sesekumpu
45	2001	Pasilatun Adawiyah Binti Ismail	Pengeringan Stim Padi
46	2000	Tan Kok Han	Reologi Larutan Bergelatin
47	2000	Yap Mee Foong	Penjadualan Kawalan Proses Sesekumpul Dua Peringkat
48	2000	Zahiruddin B Mohamed	Penghasilan Karbon Teraktif daripada Tempurung Kelapa Sawit dengan Tindak Balas Kimia untuk Menjerap Gas Hidroklorik
49	1999	Chan Chiaw Fang	Reka Bentuk Ringkas Penjerap
50	1999	Kew See Shin	Pengoptimuman Proses Sesekumpul
51	1999	Ahmad Firdaus Bin Mat Taib	Reologi Makanan
52	1998	Azlan Kahalil	Pencirian dan Penoperasian Turus Penyulingan
53	1998	Yong Hong Sin	Simulasi Aliran dalam Stek Sel Bahan Api
54	1998	Hazrein A. Hamid	Kajian Aliran Elektrolit di dalam Reruang untuk Sistem Penghasilan Hidrogen Secara Hidrogen Suria
55	1998	Khor Min Che	Pentauliahan loji Pandu Ekstraksi
56	1998	Werry Lipi	Kesan Peratusan Zarah Haluske Atas Kebolehaliran Bahan
57	1998	Nor Farhana Mohd Aris	Pengeringan Buah-Buahan Tempatan
58	1998	Maizura Ibrahim	Penghasilan Hidrogen Daripada Metanol: Pencirian Mangkin Kuprum/Aluminium (III) dengan Penggalak Zn
59	1998	Seet Elaine	Perisian Analisis Risiko dalam Loji Pemprosesan Kimia
60	1998	Chan Chee Wei	Rekabentuk Sel Elektrodialisis
61	1998	Tee Yeow Fong	Pemncirian Mangkin Kuprum/Aluminium dengan Penggalak Mn dan Ch untuk Tindakbalas Penguraian Metanol
62	1997	Rafezal Mohd Said	Pemilihan Pengekstrak Multi-komponen
63	1997	Azzuddin	Simulasi Pengeringan dengan Tindak balas Kimia
64	1996	Yusnizam Yusof	Pemodelan Sel Bahan Api Polimer Pejal
65	1996	Wan Suriati	Membran Sel Bahan Api Polimer Pejal Baru
66	1996	Wong Kuek Keong	Pemodelan Pengeringan Lapisan Dalam Padi
67	1996	Nazri Ahmad	Simulasi Aliran Kucar-Kacir

68	1996	Enjang al Lanting	Ekstraksi Kucar Kacir
69	1995	Pang Tuck Seng	Simulasi Pemisahan Membran Gas dalam Gentian Berkelonsong
70	1995	Rosnah	Lokus Alah Padi pada Kandungan Lembapan Berlainan
71	1995	Nordin Zakaria	Penghasilan Karbon daripada Tempurung Kelapa
72	1995	Tan Chey Ling	Simulasi Dinamik Loji Ekstraksi Zirconium
73	1994	Sivakumar Subramaniam	Reka bentuk Sistem Pembentuk Semula Stim
74	1993	Liew Siew Loon	Kembangan Pembentuk Semula untuk Menghasilkan Hidrogen drpd Gas Asli & Stim
75	1993	Chong Loong How	Lokus Alah Biji Koko pada Kandungan Lembapan Berlainan
76	1993	Amiruddin Abd. Hamid	Pengering Koko Lapisan Bergetar
77	1993	Cheah Chee Mun	Luahan Hidrokarbon MultiKomponen Bertekanan Atas Takat Didih
78	1993	Samah Che Lamin	Kembangan Motor Roket Berbahan Dorong Pepejal
79	1992	Mohd. Shihabuddin b. Ismail	Penentuan Faktor Pandangan bagi Satu Objek Kecil Terhadap Satu Nyalaan Kebakaraan
80	1992	Azhar Ahmad	Simulasi Tumpahan Minyak
81	1992	Norleha bt. Mohd. Yusuff	Rekabentuk Sistem Penyampaian Pneumatik dengan Komputer
82	1992	Zuraimi b. Othman	Penyelesaian Masalah Pindah Haba daripada Paip Minyak Mentah Dasar Laut Menggunakan Kaedah Berangka
83	1992	Rohana Ahmad	Ekstraksi Yterrium
84	1992	Liza bt. Jaafar	Kesan Pengeringan Terhadap Tindakbalas `Browning' Koko
85	1992	Lee Hong Tein	Simulasi Monte Carlo Model Tumpahan Minyak dalam Lautan
86	1992	Mohd. Zainuddin b. Mohd. Zainal	Rekabentuk Turus Ekstraksi Zirkonium
87	1992	Farok b. Maasom	Pengeringan Terbendalir Arang Batu Malaysia
88	1991	Halimahton bt. Baharum	Penskalaan Naik Penghasilan Kitin daripada Kulit Udang
89	1991	Badariah bt. Manab	Penskalaan Naik Penghasilan Bromelin dari Batang Nenas
90	1991	Ropandi b. Mamat	Pengekstrakan Torium dengan Turus Ekstraksi Terpadat
91	1989	Kamaroulzaman b. Thith	Pengoptimuman Penghasilan Bromelin daripada Batang Nenas
92	1989	Juriah bt. Jabar	Lengkung Keseimbangan Sistem Air-Thorium-Kerosin-TBP dan Sistem Air-Uranium-Kerosin-TBP daripada Sisa Perlombongan
93	1989	Md. Salleh b. Kamaruddin	Pengoptimuman Proses Penghasilan Kitin daripada Kulit Udang
94	1989	Bita ak Ata	Simulasi Pengering Kernel Kelapa Sawit
95	1989	Yusof Darus	Penggunaan AutoCad dalam Penyusunan Loji
96	1988	Gerard Wang Chee Shoon	Dinamik dan Kawalan Penyejat Filem Memanjat QVF
97	1988	Raveentiram Krishna	Rekabentuk Rig bagi Penghidrogenan Selanjar Kelapa Sawit
98	1988	Norsham bt. Nordin	Ciri Pengeringan Padi
99	1988	Wan Othman b. Wan Yahya	Simulasi Kawalan Fermentor
100	1988	Siti Fatimah bt. Hj. Abd. Rashid	Kinetik Pengeringan Kelapa Sawit
101	1987	Tajul Ariffin b. Hj. Mohd. Rais	Penghasilan Kanji Pra-Digelatin dengan Pengering

			Lapisan Terpancut
102	1987	Mut Sagai	Pengaturcaraan Rekabentuk Menara Penyulingan Berplat
103	1987	D. S. Krishana Rao	Pembangunan Proses Pemisahan Bromelin daripada Batang Nenas
104	1986	Othman Darus	Rekabentuk Proses Pengeringan Lapisan terpancut
105	1986	Goh Eng Hooi	Ciri-Ciri Injap Kawalan
106	1986	Mohd. Razi b. Mohd. Toff	Reologi Kanji Beras Digelatin pada Suhu Tinggi
107	1986	Suhaimi b. Said	Rekabentuk Terbantu Komputer
108	1986	P. Govindasamy	Pemprosesan Kitin daripada Kulit Udang
109	1985	Beh Kok Chuan	Penyediaan Rajahaliran Proses dengan Kaedah Komputer
110	1985	Ku Halim Ku Hamid	Reologi Kanji Beras Digelatin pada Suhu Rendah
111	1985	Zakaria Omar	Penyelesaian Berangka Persamaan Pengeringan Bahan Berliang