## PROF. IR. DR. ABDUL WAHAB MOHAMMAD



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#### **EDUCATIONAL QUALIFICATIONS**

University of Wales Swansea, United Kingdom (Jan. 1995- May 1998) PhD in Chemical Engineering

Thesis: Predictive Models for Nanofiltration Membrane Processes

Purdue University, Indiana, USA (Sept 1989- May 1991)

MSc in Chemical Engineering, May 1991

Thesis: Pressure Drop Correlations and Scale-Up with Compressible Packings

Lehigh University, Bethlehem, Pennsylvania, USA (Jan. 1986- June1989) BSc in Chemical Engineering, Cum Laude, June 1989

## PROFESSIONAL QUALIFICATIONS

Registered Professional Engineer (PEng) with Board of Engineers Malaysia (11460) Chartered Engineer (CEng) with the Engineering Council UK (564819) Corporate Member, Institution of Engineers Malaysia (M 21917) Fellow, Institution of Chemical Engineers (IChemE) (99911244)

#### **HONOURS/AWARDS**

Silver Medal, BioInno Award 2010, BioMalaysia 2010

Prince Sultan International Prize for Water – Category: Innovative Methods and Systems in Desalination (2008)

Editorial Board Desalination Journal (2009)

UNSW Visiting Research Fellow (2008-2011)

UKM Citra Award (2009)

UKM Excellent Service Award (2006, 2008)

UKM Research Award (2007)

UKM Research Award – Individual (Certificate) (2006)

Research Fellowship, Middle East Desalination Research Center (MEDRC) (2003 and 2005)

Silver Medal, International Invention, Innovation, Industrial Design & Technology Exhibition (ITEX 2005)

## CURRICULUM VITAE

Young Researcher Award UKM (2003)

Best Paper Award (Co-author), Energy: International Conference on Advances in Strategic Technologies (ICAST) (2003)

Gold Medal, 31<sup>st</sup> Salon International Inventions Geneva 2003

Marquis Who's Who in Science and Engineering 7<sup>th</sup> Edition (2003)

Silver Medal, Ekspo Sains dan Teknologi Kebangsaan 2002

Bronze Medal, International Invention, Innovation, Industrial Design & Technology Exhibition (ITEX 2002)

Purdue University Graduate Research Scholarship 1989 - 1991

Tau Beta Pi, National Honorary Engineering Society (USA)

Dean's List

Scholarship, Program American Top University, Public Service Dept. Malaysia 1985 - 1989

## **CAREER HISTORY**

Aug 2005 – Present	Professor (Membrane and Separation Technologies), Dept. of Chemical and Process Engineering, UKM
Aug 2009 – Present	Director, Industry Liaison Office UKM
Feb 2008 – Aug 2009	Deputy Dean (Undergraduate, Alumni and Community Relations)
Aug 2005 – Feb 2008	Director, Advanced Engineering Centre, Faculty of Engineering UKM cum Deputy Dean (Research and Innovation)
June 2003 — July 2005	Head of Department, Dept. of Chemical and Process Engineering, UKM
April 2001 – May 2003	Industrial Training Coordinator, Faculty of Engineering, UKM
Jan 2000 – Aug 2005	Associate Prof, Dept. of Chemical and Process Engineering, UKM
June 1991 – Present	Consultant with UKM Pakarunding Sdn. Bhd.
June 1991 – Dec 1999	Lecturer, Dept. of Chemical and Process Engineering, UKM
July 1989 - May 1991	Tutor, Dept. of Chemical and Process Engineering, UKM and Research Assistant, School of Chemical Engineering, Purdue University, USA
May 1988 - Dec 1988	Undergraduate Research Assistant, Environmental Engineering Laboratory, Department of Civil Engineering, Lehigh University, USA

## SIGNIFICANT CAREER ACHIEVEMENT

Research and Development	Have actively participated in research and development projects in Malaysia as well as in collaboration with partners in United Kingdom, United States, Belgium, and Jordan. Projects covering important areas in nanofiltrations, desalination, chemical separations and design. Total project worths exceed RM 10 million. Have published in international journals and presented in various conference throughout the world. Height and the conference of 10 and to its force and the conference of 10 and to its force and the conference of 10 and to its force and the conference of 10 and to its force and the conference of 10 and to its force and the conference of 10 and to its force and the conference of 10 and the conference of
	index of 12 and citations exceeding 700.

**Industrial** Have actively engaged as a consultant for various companies in the areas of environmental impact and risk and hazard assessment. Have

## CURRICULUM VITAE

Consultation lead more than 15 consultancy projects for companies such as

Petronas Gas Berhad, BASF Petrochemicals, Petronas Penapisan

Terengganu, and Megasteel.

Leadership and Administration

Have been appointed as Industrial Training Coordinator (2001-2003),

Head of Department (2003-2005), Director of Advanced

Engineering Centre (2005-2008), Deputy Dean (2007-2009) and at present Director, Industry Liaison Office. Currently heading the research group on separation processes. At the national level, I have served as the Honorary Secretary of the Institution of Chemical Engineers Malaysia from 2002-2006 and member of the Engineering Accreditation Council (EAC) for Board of Engineers Malaysia (BEM).

## AREAS OF RESEARCH INTEREST

Head of Scale-up and Downstream Processing Research Group in UKM *Areas of interest:* 

Nanofilters Development and Characterisation, Membranes and Separation Technology Process Modelling and Application, Risk and Hazard Assessment of Petrochemical Facilities Engineering Education, Project Management

#### SUPERVISION

Currently is supervising 5 PhD students and 4 Master students.

Graduated 3 PhD and 4 Master students and more than 25 students on Final year Research Project.

#### **TAUGHT COURSES**

Separation Processes, Membrane Science and Technology, Advanced Distillation Engineering Economics, Project Management, Risk and Hazard Assessment

## PROFESSIONAL/SOCIETY MEMBERSHIP

Fellow Member, Institution of Chemical Engineers (IChemE) UK

Member, Society for Environmental Auditors Malaysia (SEAM)

Member, European Desalination Society

Former Member of European Membrane Society and American Institute of Chemical Engineers

Life Member, Old Putera Association (OPA)- Ex-student Society for Royal Military College, Sungei Besi (LMA 390).

## APPOINTMENT RELATED TO HIGHER EDUCATION/QUALITY ISSUES

- 1. Observer, Canadian Engineering Accreditation Board, Accreditation visit to Dalhousie University, Halifax Canada (October 2007)
- 2. Member, Engineering Accreditation Council (EAC) Lembaga Jurutera Malaysia (2005 present)
- 3. Member, Sub-Committe Member, Engineering Accreditation Manual for Board of Engineers Malaysia (2004 2006)

- 4. Head and Panel Member for Engineering Accreditation Board of Engineers Malaysia (2004 2006) at the following universities:
  - Universiti Malaysia Sabah (2004)
  - Universiti Teknologi Mara (2004)
  - Universiti Malaya (2004)
  - Universiti Putra Malaysia (2004)
  - Kolej Universiti Kejuruteraan dan Teknologi Malaysia (2006)
  - Universiti Sains Malaysia (2006)
  - Terengganu Advanced Technical Institute (2006)
  - Universiti Teknologi Petronas (2007)(as observer)
  - University of Nottingham Malaysia (2009)
  - Universiti Islam Antarabangsa (2009)
  - Universiti Teknologi Malaysia (2009)
- 5. Invited speakers for Outcome Based Education (OBE) in various seminar/workshops organized by Board of Engineers Malaysia (BEM) and local universities (2004 present)
- 6. Chairman, Committee for Key Performance Indicators (KPI), Faculty of Engineering UKM
- 7. Member, Committee for Revision of the UKM Strategic Plan 2020 (2004 2005)

#### PUBLICATION/PRESENTATION RELATED TO QUALITY MANAGEMENT

- 1. Engineering Programme Accreditation Manual Ver. 3 (2005), Revise Version (2007)
- 2. Pelan Strategik UKM Perspektif 2006-2010
- 3. *Programme Assessment and Evaluation*, presented at the Outcome Based Education (OBE) Workshops (2005, 2006) organised by various engineering faculties in Malaysia.
- 4. Preparing Document for Engineering Accreditation, presented at the Outcome Based Education (OBE) Workshops organised by Board of Engineers Malaysia (2006,2007)
- 5. Research Outcomes and Consequence, presented at the Penilaian Tahap Kecekapan (PTK 6) Workshop in UKM (2005, 2006)
- 6. *Research Management*, presented at the Post-Graduate Students Workshop, Faculty of Engineering UKM (2005-2007).
- 7. Opportunities for Research Grants, presented at the Quantitative Research Workshop organised by Pusat Pengembangan Akademik (PPA) UKM (2007).
- 8. *Ciri-ciri Penyelidik Cemerlang*, presented at the Young Lecturers Workshop organised by Pusat Pengembangan Akademik (PPA) UKM (2003).
- 9. Professional Interview Part 1: Significant issues facing Malaysia to meet the challenge of globalization and the emergence of the IT age, *Jurutera*, March: 15 (2002).

## SHORT COURSES/SEMINARS/WORKSHOP

Have attended more than 50 short courses/seminars/conference/workshop in Malaysia and overseas. Among them:

Related to Quality Issues:

Lembaga Jurutera Malaysia: Bengkel Manual Akreditasi Kejuruteraan (2005)

Engineering Accreditation Council: Evaluators' workshop (2004)

Bengkel Fakulti ABET (2004)

## CURRICULUM VITAE

Bengkel Penstukturan Dalaman UKM (2004)

Advanced EMS Audit Workshop-Lead Auditor Program (2003)

Bengkel ISO14000 untuk Agensi Awam-Bahagian II, Kuala Lumpur (2003)

Bengkel ISO14000: Sistem Pengurusan Alam Sekitar (Bhg 1), Kuala Lumpur (2002)

## Related to Research Areas:

International Congress on Membrane and Membrane Processes (ICOM 2005), Seoul, Korea (2005)

2nd Regional Symposium on Membrane Science and Technology, Johor Bahru (2004)

EuroMEd 2004: Desalination Strategies for Mediterranean Countries, Marrakech, Morocco (2004)

International R & D Forum On Oil, Gas and Petrochemicals, Kuala Lumpur (2004)

17th Symposium of Malaysian Chemical Engineers 2003, Copthorne Orchids Hotel, Pulau Pinang (2003)

2nd Asian Particle Technology Conference, Batu Feringgi, Pulau Pinang (2003)

3rd International Conference on Advances in Strategic Technologies 2003 Kuala Lumpur (2003)

# OTHER ACADEMIC REFEREE/ APPOINTMENTS International Level

- 8. Regional Author, Asia Pacific Nanotechnology Forum News (2003 2004)
- 9. MEDRC Visiting Research Fellow, School of Chemical, Mining and Environmental Engineering, University of Nottingham, UK. (2003, 2005)
- 10. Panel review for research grant proposal for the Faculty of Engineering, King Fahd University of Petroleum & Minerals (2006)
- 11. Referee for international journals such as Chemical Engineering Journal, Applied Clay and Sciences, Journal of the American Ceramic Society, Journal of Food Engineering, Chemical Engineering Science, Journal of Membrane Science, Separation Science and Technology, and International Journal of Hydrogen Energy.
- 12. Appointed as External Examiner for MPhil Thesis at University of Nottingham, United Kingdom (2003, 2005)
- 13. Appointed as a Consultant to the Local Project Implementation Unit (LPIU) DUE-Project Universitas Riau, Indonesia (2002).
- 14. Appointed as Instructor for Course on Synthetic Membrane Characterization at Department of Physical Chemistry, Universitas Riau, Indonesia (2002).

## National Level

- 15. Member, Engineering Accreditation Council (EAC) (2005 present)
- 16. Member, Board of Studies, Universiti Malaysia Perlis (2007 present)
- 17. Appointed as Head Evaluation Panel for Accreditation by Board of Engineers Malaysia (2004 2005)
- 18. Referee for Malaysian journals such as Journal of Physical Science, Engineering Journal Kejuruteraan UKM, IIUM Engineering Journal and Journal of Industrial Technology.
- 19. Appointed as external examiner for Master's/PhD thesis at Universiti Teknologi Malaysia, Universiti Putra Malaysia, Universiti Sains Malaysia and Universiti Malaya.
- 20. Appointed as Member of Technical Committee (Petrochemical) Majlis Amanah Rakyat Malaysia (MARA) to advise MARA on the establishment of Malaysian Institute of Chemical Engineering Technology (MICET).
- 21. Appointed as Member of Technical Committee for assessing the Detailed EIA Report for several projects by Dept. of Environment, Malaysia.

- 22. Organising Committee Member. Asian Particle Technology Conference 2003.
- 23. Organising Committee Member, Regional Symposium of Chemical Engineers (RSCE 2002).
- 24. Secretary, Organizing Committee, Symposium of Malaysia Chemical Engineers (SOMChE 2003).

## **University Level**

- 25. Head, Engineering Research Cluster under the Research University Grouping (2007).
- 26. Member, Advanced Materials and Manufacturing Research Focus Group (2007)
- 27. Member, Review Committee for UKM Strategic Plan (2004 2006)
- 28. Student Design Award, Department of Chemical and Process Engineering (1998-2002). Responsible for the *Separation Processes* section.
- 29. Appointed as internal examiner for Master and PhD Theses at Universiti Kebangsaan Malaysia (3 Theses).
- 30. Industrial Training Coordinator, Faculty of Engineering.
- 31. Secretary, Organizing Committee, International Conference on Advances in Strategic Technologies (ICAST 2003).
- 32. Members of various committees at faculty and university level.

## **RESEARCH PROJECTS**

- Development of Modular, Automated, and Process-Intensified Gelatine (Water Soluble Protein) Pilot Plant for the World Halal Market, RM 3.19 million, Technofund TF0206A084 (2007 – Present) Head
- 2. Novel Separation Methods In Biodiesel Production Using Solvent Stable Nanofilters Technology, RM 160,000 Science Fund 03-01-02-SF0054 (2006 present) (Head)
- 3. Development of Hybrid Organic-Inorganic Nanofilters for Recovery of Biological Products, RM 217,000 IRPA 09-02-02-0070-EA197 (Head) (2002 2005)
- 4. Development of Novel Approach to the Prediction of Nanofiltration Membranes Performance Using Advanced Atomic Force Microscopy (AFM), US\$ 263,630 from Middle East Desalination Research Centre, Oman (Member) (2003 2006)
- 5. Development of Commercially-Competitive Polymeric Nanofiltration Membranes for Water Treatment Applications, RM 148,000 IRPA 09-02-02-0067 (Head) (1999 2002)
- 6. Development of Innovative Drying Technology, RM 863,392 IRPA Kod 03-02-02-0028 (Member) (2000 2004)
- 7. Synthesis and Characterisation of Chitosan Membranes for Gas Separation, UKM Grant FK005/98 RM9750 (Head) (1998 1999)
- 8. Predictive Models for Nanofiltration Membrane System, Biochemical Engineering Group, Department of Chemical Engineering, University of Wales Swansea, United Kingdom (Member). Completed, Funded by Universiti Kebangsaan Malaysia, Biological and Biochemical Science Research Council, UK (Member) (1995 1998)
- 9. Evaluation of the salt retention of nanofiltration membranes using the Donnan Steric partitioning Pore Model, (Member) UKM, U. of Wales Swansea, University Catholic Leuven, Belgium, funded by University Catholic Leuven, Belgium (1996 1998)
- Scale-Up of Chromatographic System with Compressible Packings, School of Chemical Engineering, Purdue University, USA, funded by National Science Foundation Grant EET-8613167 and BCS-8912150 (Member) (1989 – 1992)

#### **CONSULTANCY PROJECTS**

More than 30 consultancy projects in the area of Risk and Hazard Assessment

#### Selected Lists

- 1. Environmental Impact Assessment (EIA) Guidelines for Risk Analysis, submitted to Department of Environment, Ministry of Natural Resources and Environment (2004).
- 2. Supplementary Environmental Impact Assessment and Risk and Hazard Analysis Study of the Debottlenecking Project (Phase 1) at KR-2 Aromatic Complex, in Kerteh, Terengganu for Aromatics (M) Sdn. Bhd.(2004).
- 3. Environmental Impact Assessment and Risk and Hazard Analysis Study of the the Proposed Cogeneration Plant in Petronas Refinery in Tangga Batu, Melaka for Petronas Penapisan (Melaka) Sdn. Bhd. (2004).
- 4. Environmental Monitoring Plan for GPP-2,3 Complex. Submitted to Petronas Gas Berhad, June (2003).
- Environmental Impact Assessment and Risk and Hazard Analysis for the proposed KTMB Double-Tracking Railway from Seremban to Johor Bharu for KTM Berhad . (August 2002)
- 6. Supplementary Environmental Impact Assessment and Risk and Hazard Analysis for the proposed Debottlenecking Project at Acetic Acid Plant, Kerteh, Terengganu for BP Petronas Acetyls Sdn. Bhd. (August 2002)
- 7. Environmental Impact Assessment and Risk and Hazard Analysis for the proposed Ethane Extraction Improvement Project at Gas Processing Plant 2&3, Kerteh, Terengganu for OGP Sdn. Bhd. (July 2002)
- 8. Supplementary Environmental Impact Assessment and Risk and Hazard Analysis for the proposed Ethane Extraction Improvement Project at Gas Processing Plant 4, Kerteh, Terengganu for OGP Sdn. Bhd. (May 2002)

## **SELECTED PUBLICATIONS/WRITINGS**

900+ Total Citations, H-Index of 14

80+ Published Journal Papers

60+ Published Conference Proceedings

20+ Other Technical Reports and Presentations

## List of Journal paper published

- Indok Nurul Hasyimah Mohd Amin, Abdul Wahab Mohammad, Mastura Markom, Leo Choe Peng. Effects of fatty acids on UF membrane fouling in the clarification of a Glycerin-rich solution, Journal of Food Engineering (2010) 101(3), December 2010, Pages 264-272
- Indok Nurul Hasyimah Mohd Amin, Abdul Wahab Mohammad, Mastura Markom, Leo Choe Peng, Nidal Hilal, Analysis of deposition mechanism during ultrafiltration of glycerin-rich solutions, Desalination 261 (2010) 313–320
- 3. Ying Pei Lim, **Abdul Wahab Mohammad**, PHYSICOCHEMICAL PROPERTIES OF MAMMALIAN GELATIN IN RELATION TO MEMBRANE PROCESS REQUIREMENT, in press Food and Bioprocess Technology (2009) (IF: 0 ISI)
- 4. Ying Pei Lim, **Abdul Wahab Mohammad**, Effect of solution chemistry on flux decline during high concentration protein ultrafiltration through a hydrophilic membrane, *Chemical Engineering Journal* 159 (2010) 91–97

- 5. Wu Ta Yeong, Abdul Wahab Mohammad, Jamaliah Md. Jahim, Nurina Anuar, Pollution control technologies for the treatment of palm oil mill effluent (POME) through end-of-pipe processes Journal of Environmental Management, Journal of Environmental Management 91 (2010) 1467-1490) (IF: 1.794) Rank 66/163 in Environmental Science
- Indok Nurul Hasyimah Mohd Amin, Abdul Wahab Mohammad, Mastura Markom, Leo Choe Peng, Nidal Hilal, Flux decline study in ultrafiltration of glycerin-rich fatty acid solutions, Journal of Membrane Science 351 (2010) 75–86 (2010). (IF: 3.247) Rank 4/116 in Engineering, Chemical
- A.W. Mohammad\*, R. Kadir Basha, C.P. Leo, Nanofiltration of glucose solution containing salts: effects of membrane characteristics, organic component and salts on retention, *Journal of Food Engineering* 97 (2010) 510–518 (IF: 2.081) Rank 15/116 in Engineering, Chemical.
- Rahimah Othman, Abdul Wahab Mohammad,\*, Manal Ismail, Jumat Salimon, Application of Polymeric Solvent Resistant Nanofiltration Membranes for Biodiesel Production, Journal of Membrane Science 348 (2010) 287–297 (IF: 3.247) Rank 4/116 in Engineering, Chemical
- 9. **Abdul Wahab Mohammad**, Peng Tong Yap , Ta Yeong Wu, Performance of hydrophobic ultrafiltration membranes in the treatment and protein recovery from palm oil mill effluent (POME), *Desalination and Water Treatment* 10 (2009) 332–338 (IF: 0 ISI)
- Amilia Linggawati, Abdul Wahab Mohammad, Zulkafli Ghazali, Effect Of Electron Beam Irradiation On Morphology And Sieving Characterictics Of Nylon-66 Membranes, European Polymer Journal 45 (2009) 2797-2804. (IF: 2.143) Rank 17/73 in Polymer Science
- 11. A. Linggawati, **A.Wahab Mohammad**, Z. Ghazali, Physical, thermal and mechanical properties of polymeric membranes modified by radiation, *Recent Res. Devel. APpl. Pol. Sci*, 4: 311-329 (2009).
- 12. Ta Yeong Wu, Abdul Wahab Mohammad, Jamaliah Md. Jahim and Nurina Anuar, Optimized reuse and bioconversion from retentate of pre-filtered palm oil mill effluent (POME) into microbial protease by Aspergillus terreus using response surface methodology, J. Chemical Tech. & Biotech 84: 1390-1396 (2009). (IF: 1.682 Rank 29/116 in Engineering, Chemical).
- 13. Edy Herianto Majlan, Wan Ramli Wan Daud, Sunny E. Iyuke, Abu Bakar, Mohamad, A. Amir H. Kadhum, Abdul Wahab Mohammad, Mohd. Sobri Takriff, and Nurhaswani Bahamana, Hydrogen purification using compact pressure swing adsorption system for fuel cell, *International Journal of Hydrogen Energy* 34: 2771-2777 (2009)
- 14. Wu Ta Yeong, Abdul Wahab Mohammad, Jamaliah Md. Jahim, Nurina Anuar, A holistic approach to managing palm oil mill effluent (POME): Biotechnological advances in the sustainable reuse of POME, *Biotechnology Advances*, 27 p40-52 (2009) (IF: 6.110) Rank 8/144 in Biotechnology & Applied Microbiology.
- 15. M.S.Takriff, N. Masngut, A.A.H Kadhum, M.S.Khalil, **A.W. Mohammad**, Solvent Fermentation from Palm Oil Mill Effluent using Clostridium acetobutylicum in Oscillatory Flow Bioreactor, *Sains Malaysiana*, 38(2) (2009) pp191-196.
- 16. Mohd Sobri Takriff, Siti Jamilah Hanim Mohd Yusof, Abdul Amir Hassan Kadhum, Jamaliah Jahim, **Abdul Wahab Mohammad**, Recovery of acetone-butanol-ethanol from fermentation broth by liquid-liquid extraction, *Journal of Biotechnology* 136S (2008) S460–S495

- 17. Ramlee Mustapha, Faridah Karim, Ruhizan Mohd Yasin, Norzaini Azman, Hamidah Yamat, **Abdul Wahab Muhammad**, Sobri Takriff (2008) K-Economy and Globalisation— Are Our Students Ready?, Jurnal Personalia Pelajar Bil. 11 Jun/June 2008 (1 23)
- 18. Nidal Hilal, Habis Al-Zoubi, Naif A. Darwish and **Abdul Wahab Mohammad** Neural Networks Simulation of Sodium and Magnesium Chloride Solutions Using Nanofiltration Membranes, *Chemical Engineering Research & Design*, 85 (A3) (2007) 1-14.
- 19. **A. W. Mohammad**, N. Hilal, H. Al-Zoubi and N.A. Darwish, Prediction Of Permeate Fluxes And Rejections Of Highly Concentrated Salts In Nanofiltration Membranes, *Journal of Membrane Science* 289 (2007) 40-50.
- **20. A. W. Mohammad**, N. Hilal, H. Al-Zoubi and N.A. Darwish, N. Ali, Modelling The Effects of Nanofiltration Membrane Properties on System Cost Assessment for Desalination Applications, *Desalination* 206 (2007) 215–225.
- **21.** H. Al-Zoubi, N. Hilal, N.A. Darwish, and **A. W. Mohammad**, Rejection and modelling of Sulfate and Potassium salts by Nanofiltration membranes: Neural network and Spiegler Kedem Model, *Desalination* 206 (2007) 42–60
- **22.** Nidal Hilal, Habis Al-Zoubi, Naif A. Darwish and **Abdul Wahab Mohammad**, Performance of Nanofiltration Membranes in the Treatment of Synthetic and Real Seawater, *Separation Science and Technology* (2007), 42, 493-515
- 23. Muhammad Ali Zulfikar, **A. Wahab Mohammad** and Nidal Hilal, Synthesis and characterization of poly(methyl methacrylate)/SiO<sub>2</sub> hybrid membrane, *Material Science* and Engineering 452 -453 (2007) 422-426.
- 24. T.Y. Wu, **A.W. Mohammad**, J. Md. Jahim, N. Anuar, Protein and carbohydrate recovery together with the treatment of palm oil mill effluent (POME) using ultrafiltration membrane: A study on the effect of pressure on membrane fouling, *Biochemical Engineering Journal* 35 (2007) 309–317
- 25. Amilia Linggawati, **Abdul Wahab Mohammad**, Zulkafli Gazali, 2007. Permeabilitas Membran Hibrid Nilon 66 terhadap Air dan Metanol, Jurnal Natur Indonesia, 9(2), 117-126 (ISSN 1410-9379)
- 26. Abdul Wahid, Z., Ramli, R., Muchtar, A. & **Mohammad., A.W**. 2006. Ceramic ultrafiltration membrane from nanosilica particles. Journal of Solid Mechanics and Materials Engineering Vol. 1 (2007), No. 8 pp.1043-1051
- 27. Nasratun Masngut, Mohd Sobri Takriff, **Abdul Wahab Mohammad**, Mohd Sahaid Khalil & Abdul Amir Hassan Kadhum, Performance of Oscillatory Flow Reactorand Stirred Tank Reactor in Solvent Fermentation from palm oil mill effluent, Jurnal Teknologi, No. 47(F) 2007 (ISSN 0127-9696).
- 28. Abdul Wahid, Z., Ramli, R., Muchtar, A. & **Mohammad., A.W.** 2007. The effects of SiC Concentration on the membrane thickness prepared by chemical suspension technique. Malaysia *Journal Of Sustainability Science And Management*, Volume 2 Number 1 June 2007, pp24 27.
- 29. S.K. Kamaruddin, W.R.W. Daud, **A.W.Mohammad**. 2007. Development of short-cut design method for CO removal system, *Jurnal Kejuruteraan*, 19, p63-76.
- 30. Muhammad Ali Zulfikar, **Abdul Wahab Mohammad**, Synthesis and Characterization of Poly(methyl methacrylate)/SiO2 Hybrid Membranes: Effect of Silica Contents on Membrane Structure, Jurnal Matematika dan Sains, Vol 11, No 4 (2006).

- 31. N. Hilal, H. Al-Zoubi, N. A. Darwish and **A. W. Mohammad**, Nanofiltration of Magnesium Chloride, Sodium Carbonate and Calcium Sulphate in Salt Solutions, Separation Science and Technology, 40, 3229 3321 (2006)
- 32. **A. Wahab Mohammad**, M. Ali Zulfikar, A. Amir Kadhum, and N. Hilal, Synthesis And Characterization Of Poly(Methyl Methacrylate):SiO2 Hybrid Membranes:Effect Of Solvents On Structural Properties, Journal of Applied Polymer Science 99, 3163-3171(2006).
- 33. Muhammad Ali Zulfikar, **A. Wahab Mohammad** and Nidal Hilal, Preparation and characterization of novel porous PMMA-SiO2 hybrid membranes, Desalination (2006) 192, 262-270.
- 34. T.Y. Wu, **A. W. Mohammad**, J. Md. Jahim, N. Anuar, Investigations on protease production by a wild-type Aspergillus terreus strain using diluted retentate of pre-filtered palm oil mill effluent (POME) as substrat, Enzyme and Microbial Technology, (2006) 39, 1223 1229.
- 35. S.K. Kamarudin, W.R.W. Daud, A. Md. Som, M.S. Takriff and **A.W. Mohammad**, Synthesis and optimization of a PEM fuel cell system via reactor-separation network (RSN), Journal of Power Sources, 159(2), (2006) 1194-1204
- 36. S.K. Kamarudin, W.R.W. Daud, A. Md.Som, M.S. Takriff, A.W. Mohammad. 2006. Technical design and economic evaluation of a PEM fuel cell system. Journal of Power Sources. 157 (2006) 641-649.
- 37. S. K. Kamarudin, W. R. W. Daud, A. Md. Som, **A. W. Mohammad** and S. Takriff. 2005. Synthesis and Global Optimozation Of Reactor-Separation Networks (RSN) Via NLP Procedures: PEM Fuel Cell System. Chemical Engineering Transactions 7(1): 327-332.
- 38. Zarina Abd Wahid, Rafindde Ramli, Andanastuti Muchtar dan **Abd Wahab Mohamad**. 2005. The Effects of SiC Concentration on Membrane Thickness Prepared by Chemical Suspension Technique. J. Solid State Science and Technology Letters, 12 (1-suppl.), pp 41.
- 39. Nora'aini Ali, **A. Wahab Mohammad**, Ahmad Jusoh, M.R. Hassan, Nurliza Ghazali, Khairulida Kamaruzaman, Treatment of aquaculture wastewater using ultra-low pressure asymmetric polyethersulfone (PES) membrane, Desalination 185, (2005) 1743 1752
- 40. N. Hilal, H. Al-Zoubi, N. A. Darwish and **A. W. Mohammad**, Nanofiltration of highly concentrated salt solutions up to seawater salinity, Desalination 184, (2005) 1295 1306.
- 41. N. Hilal, H. Al-Zoubi, N. A. Darwish and **A. W. Mohammad**, Characterisation Of Nanofiltration Membranes Using Atomic Force Microscopy, *Desalination* (2005) Vol. 177 pp 187-199.
- 42. Nora'aini Ali, **A. Wahab Mohammad** and A.L. Ahmad, Use Of Nanofiltration Predictive Model In Developing Criteria For Membrane Selection and Analyzing Cost Impact, *Separation and Purification Technology Journal* 41, 29-37 (2005).
- 43. **A. Wahab Mohammad**, Nidal Hilal, and M. Nizam Abu Seman, Interfacially Polymerized Nanofiltration Membranes: Atomic Force Microscopy And Salt Rejection Studies, *Journal of Applied Polymer Science* 96 (2005) p605 612.
- 44. S. K. Kamarudin, W. R. W. Daud, **A. W. Mohammad**. 2005. Hydrogen Purification System for PEMFC: A Mesoporous Tubular Ceramic Membrane and a Pressure Swing Adsorber In Series. *Journal of Solid State Science and Technology Letters*. 12(1): 139

- 45. Nora'aini Ali, **A. Wahab Mohammad**, Theoretical Analysis on Interacting Effect of Steric and Donnan Factors in Nanofiltration Membrane Separation System, *Jurnal Teknologi*, 41(F) (2004): 41-48.
- 46. A.L.Ahmad, B.S.Ooi, **A.Wahab Mohammad**, J.P.Choudhury, Composite Nanofiltration Polyamide Membrane: A Study on Diamine Ratio and Its Performance Evaluation, *Industrial & Engineering Chemistry*, 43, 8074 8082 (2004).
- 47. N. Hilal, H. Al-Zoubi, N. A. Darwish and **A. W. Mohammad**, A Comprehensive Review Of Nanofiltration Membranes: Treatment, Pretreatment, Modelling, and Atomic Force Microscopy, *Desalination* 170 (2004) pp281-308.
- 48. S.K. Kamarudin, W.R.W. Daud, A.M. Som, M.S. Takriff, **A.W. Mohammad**, Optimization of 5-kW Mobile and Portable PEMFC System via Energy Integration, ASEAN *Journal of Chemical Engineering*, 4(2), (2004) pp16 23.
- 49. S.K. Kamarudin, W.R.W. Daud, A.M. Som, M.S. Takriff, **A.W. Mohammad**, Y.K. Loke, Design of a fuel processor unit for PEM fuel cell via shortcut design method, *Chemical Engineering Journal*, 104 (2004) pp7-17.
- 50. S. K. Kamarudin, W. R. W. Daud, A. Md. Som, **A. W. Mohammad**, S. Takriff and M. S. Masdar, The conceptual design of a PEMFC system via simulation, *Chemical Engineering Journal*, 103 (2004), 99-113.
- 51. A.L.Ahmad, B.S.Ooi, J.P.Choudhury, **A.Wahab Mohammad,** Effect of constricted polymerization time on nanofiltration characteristic and performance: A study using the Donnan Steric Pore Flow Model, *Journal of Applied Polymer Science* 94 (2004) 394 399.
- 52. M. A. Zulfikar, A. W. Mohammad, Synthesis and Characterization of Poly(MethylMethacrylate)/SiO<sub>2</sub> Hybrid Membranes: Effect of Solvents on Thermal Properties, Medical Journal Malaysia, 59(Supplement B), (2004) p141-142.
- 53. **A. Wahab Mohammad**, Nidal Hilal, and Lim Ying Pei, Treatment Of Landfill Leachate Wastewater By Nanofiltration Membrane, *International Journal of Green Energy*, 1(2), p251-263 (2004).
- 54. A.L. Ahmad, B.S. Ooi, **A. Wahab Mohammad** and J.P. Choudhury, Development of highly hydrophilic nanofiltration membrane for desalination and water treatment, *Desalination* 168, p215-221(2004).
- 55. **A. Wahab Mohammad**, Nora'aini Ali and A. Latif Ahmad, Nidal Hilal, , Optimized Nanofiltration Membranes: Relevance To Economic Assessment And Process Performance, *Desalination*, 165, p243-250 (2004).
- 56. **A. Wahab Mohammad**<sup>1\*</sup>, Rizafizah Othaman and Nidal Hilal<sup>2</sup>, Potential Use Of Nanofiltration Membrane In Treatment Of Industrial Wastewater From Ni-P Electroless Plating, *Desalination* 168, p241-252 (2004).
- 57. Nidal Hilal, Gerald Busca, Nick Hankins and **Abdul Wahab Mohammad**, The Use Of Ultrafiltration And Nanofiltration Membranes In Metal-Working Fluids Treatment, *Desalination* 167, p227-238 (2004).
- 58. S.K Kamarudin, W.R.W. Daud, **A.W. Mohammad**, A.Md.Som and S.Takriff, Design Of A Tubular Ceramic Membrane For Gas Separation in a PEMFC System, *Journal Of Fuel Cell: System to Fundamental* **3**(3): (2003) 1-10.
- 59. **Abdul Wahab Mohammad**, Mohd Sobri Takriff, Use Of Professional Simulation Software Towards Better Integration In Chemical Engineering Undergraduate Curriculum, *World Transaction in Engineering and Technical Education* 2(2), p321-324 (2003).

- A. Wahab Mohammad and Mohd Sobri Takriff, Predicting Flux And Rejection Of Multicomponent Salts Mixture In Nanofiltration Membranes, *Desalination*, 157, p105-112 (2003).
- 61. Nidal Hilal, **A. Wahab Mohammad**, Brian Atkin and Naif A. Darwish, Using Atomic Force Microscopy Towards Improvement In Nanofiltration Membranes Properties For Desalination Pre-Treatment: A Review, *Desalination*, *157*, *p137-144* (2003).
- 62. **A. Wahab Mohammad**, Nidal Hilal, and M. Nizam Abu Seman, A Study On Producing Composite Nanofiltration Membrane With Optimized Properties, *Desalination*, *158*, *p73-78* (2003).
- 63. Wu Ta Yeong, **A. Wahab Mohammad\***, Nurina Anuar and Rakmi A. Rahman, Potential Use Of Nanofiltration Membrane In Treatment of Wastewater from Fish And Surimi Industries, *Songklanakarin Journal of Science and Technology*, 24, p977-988 (2003).
- 64. **A. Wahab Mohammad**, Nora'aini Ali and Nidal Hilal, Investigating Characteristics Of Increasing Mwco Polyamide Nanofiltration Membranes Using Solutes Rejection And Atomic Force Microscopy, *Separ. Sci. Technol.*38(6), (2003) p1307-1327
- 65. **A. Wahab Mohammad**, Noraaini Ali dan M. Nizam Abu Seman, and Nidal Hilal, 2003. Towards Optimized And Improved Nanofiltration Membranes: Benefits And Problems, *Jurnal Jurutera Kimia Malaysia.*, 3:61-72 (2003)
- 66. S.K. Kamaruddin, W.R.W. Daud, M.S. Ayub, **A.W. Mohammad**, S. Takriff, and S.E. Iyuke, A Review on Fuel Cell as Advanced Power Source, *ASEAN Journal of Chemical Engineering*., 2(1), 75-86 (2002).
- 67. **A. Wahab Mohammad\***, Mazrul Nizam Abu Seman dan A. Amir H. Kadhum, Pencirian Membran Penurasan Nano Yang Dihasilkan Menggunakan Kaedah Pempolimeran Antaramuka, *Journal of Industrial Technology*, 11(2) (2002), p33 45.
- 68. **A. Wahab Mohammad\***, Nora'aini Ali, Understanding the Steric and Charge Contributions in NF Membranes Using Increasing MWCO Polyamide Membranes, *Desalination*, 147, 205-212 (2002).
- 69. **A. Wahab Mohammad\***, Lim Ying Pei and A. Amir H. Kadhum, Characterization And Identification of Rejection Mechanisms in Nanofiltration Membranes Using Extended Nernst-Planck Model, *Clean Technologies and Environ. Policy*, *4*(3):151-156 (2002).
- 70. **A. Wahab Mohammad\***, A Modified Donnan-Steric-Pore Model for Predicting Flux and Rejection of Dye/NaCl Mixture in Nanofiltration Membranes, *Separ. Sci. Technol.* 37(5) (2002) p1009-1030.
- 71. **A. Wahab Mohammad**, Professional Interview Part 1: Significant issues facing Malaysia to meet the challenge of globalization and the emergence of the IT age, *Jurutera*, March: 15 (2002).
- 72. J. Schaep, C. Vandecasteele, **Abdul Wahab Mohammad**, W. R. Bowen, Modelling the retention of ionic components for different nanofiltration membranes, *Separation and Purification Technol.*, 22-23:1-3:169 179 (2001).
- 73. **Abdul Wahab Mohammad**, Prediction of concentration polarisation effect in nanofiltration membrane using a Stirred Cell, *Pertanika J. Sci. & Technol.*, 9(1) (2001) p99-109.
- 74. **Abdul Wahab Mohammad**, Simple mass transfer experiments using nanofiltration membranes, *Chemical Engr. Education*, 34 (3), (2000).

- 75. J. Schaep, C. Vandecasteele, **Abdul Wahab Mohammad** and W.R. Bowen, Evaluation of the salt retention of nanofiltration membranes using the Donnan and steric partitioning model, *Separ. Sci. Technol.*. 34(15) (1999) p3009-3030.
- 76. W.R. Bowen, **Abdul Wahab Mohammad**, A Theoretical Basis for specifying nanofiltration membranes- dye/salt/water streams, *Desalination*, 117 (1998) p257-264.
- 77. W.R. Bowen, **Abdul Wahab Mohammad**, Characterisation and prediction of nanofiltration membrane performance A general assessment, *Transaction IChemE*, 76A (1998) p885-893.
- 78. W.R. Bowen, **Abdul Wahab Mohammad**, Diafiltration of dye/salt solution by nanofiltration: Process prediction and optimisation, *AIChE Journal*, 44 (1998) p1799-1812.
- 79. W.R. Bowen, **Abdul Wahab Mohammad**, and N. Hilal, Characterisation of nanofiltration membranes for predictive purpose use of salts, uncharged solutes, and atomic force microscopy, *J. of Membrane Sci.*, 126, (1997), p91-105.
- 80. **Abdul Wahab Mohammad**, D.G. Stevenson, P.C. Wankat. Pressure drop correlations and scale-up of size exclusion chromatography with compressible packings, *Ind. & Engr. Chemistry Research*, 31, 2, 1992, p 549-561.
- 81. **Abdul Wahab Mohammad**, Empirical correlations for pressure drop across a bed packed with compressible packings, *Jurnal Kejuruteraan*, 5, (1993), p13-24.
- 82. Rakmi Abdul Rahman, Mohd Saleh Suwandi, Mohd Fauzi Yusoff, Wan Ramli Wan Daud, Jailani Salihon, Zahedi Fisal, Abu Bakar Mohamad, Normah Abdullah dan **Abdul Wahab Mohammad**, Kemajuan Kejuruteraan kimia di Malaysia: Penyelidikan di Jabatan Kejuruteraan Kimia dan Proses Universiti Kebangsaan Malaysia, *J. Jurutera Kimia Malaysia*, 1 (2) (1992), 1-19.