

Table of Contents

Preface and Committees

Chapter 1: Nanomaterial Research and Application

Design and Synthesis Silica-Polyelectrolyte-Iron Oxide Nanocomposite with Magnetic-Catalytic Bifunctionalities for Dye Removal H.X. Che, S.P. Yeap, A.A. Latif and J.K. Lim	3
Effect of Calcination Temperature on the Morphological and Phase Structure of Hydrothermally Synthesized Copper Ion Doped TiO₂ Nanotubes R. Mohd Hasmizam, M.N. Ahmad-Fauzi, A.R. Mohamed and S. Sreekantan	7
Nanoclay for Micropollutant Removal in Wastewater-Effective Alternative? M.F.M. Amin, S.G.J. Heijman and L.C. Rietveld	11
S-Parameters of Bismuth Iron Garnet (BIG) Filled Polyvinylidene Fluoride Composite Using Rectangular Waveguide Method H. Soleimani, N. Yahya, K. Shameli, Z. Abbas, L.K. Chuan and J. Amighian	15
Controlled Growth of ZnO Nanoparticles with Different Morphologies Using Sol-Gel Technique M.T. Thein, S.Y. Pung, A. Aziz and M. Itoh	19
Improving the Production of Self-Assembled ZnS:Mn Nanocrystals through the Modification of Sol Gel – Spin Coating Approaches A.A.M.A. Noor, S. Shaari and S.A.R. Mohammad	23
Fabrication of Anodic Alumina Templates on Ti/Si Substrate and Preparation of Cu Nanorods by Electrochemical Process K.M. Chahrour, N.M. Ahmed, M.R. Hashim and N.G. Elfadill	27
P-Incorporated TiO₂ Nanotube Arrays by Wet Impregnation Method for Efficient Photocatalytic Activity K.A. Saharudin and S. Sreekantan	31
Carbon Dioxide Capture at Various Temperatures Using Ca(OH)₂ Sorbent Fabricated by Sol-Gel Route in Ethanol Media F.D. Mohd Daud, S. Sreekantan and A.R. Mohamed	35
Fe-TiO₂ Nanoparticles by Hydrothermal Treatment with Photocatalytic Activity Enhancement I.S. Aida and S. Sreekantan	39
Formation of Platinum Nanodendrites Embedded Organic Insulator for Memory Application R. Nur Syafinaz, N.I. Muzzafaruddin, A.R. Khairunisak and K.C. Aw	44
Simulation and Fabrication of Silicon Field Emission Cathodes for Cold Electron Sources C. Langer, C. Prommesberger, R. Lawrowski, F. Dams and R. Schreiner	48
Synthesis and Characterization of Zn-Al Layered Double Hydroxide (LDH) Nanocomposite Intercalated with Sodium Dodecyl Sulfate (SDS) S. Babakhani, Z.A. Talib, M.Z. Hussein and A.A.A. Ahmed	52
The Effect of Zinc Oxide and Aluminum Oxide Nanoparticles on Interfacial Tension and Viscosity of Nanofluids for Enhanced Oil Recovery H.M. Zaid, N.R. Ahmad Latiff and N. Yahya	56
Effect of Metal Catalysts Type and Annealing Time on the Growth of Zinc Oxide Nanostructures by Thermal Vapor Deposition Method A.B. Rosli, K.A. Yusof, S.H. Herman, M.H. Johari, S. Shariffudin and M.H. Ani	60
Effect of Oxygen Flow Rate on the Memristive Behavior of Reactively Sputtered TiO₂ Thin Films N.S. Kamarozaman, M.U. Shamsul, S.H. Herman and W.F.H. Abdullah	64
Synthesis of CdSe Nanoparticles: Control of Reaction Temperature M.N. Ishak and K.A. Yaacob	68
The Effect of Hydrothermal Reaction Time on Formation of AuNPs by Sacrificial Templated Growth Hydrothermal Approach S.A. Ng, A.R. Khairunisak, K.Y. Cheong, P.C. Ooi and K.C. Aw	71

Characterization of ITO/Ag and ITO/Ni Bi-Layer Transparent Conductive Electrodes A.H. Ali, A.S. Abu Bakar, M.A. Ahmad and H. Zainuriah	75
Fabrication of Gold Nanoparticles on Multiwalled Carbon Nanotubes Nanohybrids S.H. Alias, S.S.S. Sondig, A.M. Md Jani and H. Yazid	79
Microwave Synthesis of ZnO Nanoparticles for Enhanced Oil Recovery M.S. Alnarabiji, N. Yahya, S. Bee Abd Hamid, K.A. Azizli, A. Shafie and H. Solemani	83
Synthesizing Vertically Aligned Zinc Oxide Nanowires on Borosilicate Glass Using Vapor Trapping Approach N.H. Shamsudin, K.A. Abdul Khalid and K. Mohamed	87
Preparation of WO₃ Nanorods by Seeded Growth Hydrothermal Reaction C.Y. Ng, Z.R. Yip, A.R. Khairunisak and Z. Lockman	91
Formation and Characterization of TiO₂ Scattering Layer Deposited by Spray Pyrolysis for DSSC K.A. Yaacob and M.S. Borhanuddin	95
Effect of Applied Voltage on the Formation of Self-Organized Iron Oxide Nanoporous Film in Organic Electrolyte via Anodic Oxidation Process and their Photocurrent Performance M. Rozana, M.A. Azhar, D.M. Anwar, G. Kawamura, A.R. Khairunisak, A. Matsuda and Z. Lockman	99
Electrolyte Influence on the Morphologies of Anodic ZrO₂ Nanotube Arrays Formed by Anodization S. Ismail, M. Rozana, D.M. Anwar, G. Kawamura, A. Matsuda and Z. Lockman	104
Synthesis of Titanium Dioxide Nanoparticles in Natural Rubber Latex Medium K.S. Tan	108
Morphology Controlled Ionothermal Synthesis and Characterization of Ceria Nanomaterials Y.T. Lee, S. Chowdhury, M.A. Bustam, M.I.A. Mutalib and M.M. Norani	112
Micro Powder Injection Moulding Using Nanosized Powders N. Muhamad, J. Rajabi, A.B. Sulong, A. Fayyaz and M.R. Raza	116
Characterization of Nanocrystalline p-CuO/n-Si Hetrojunction Prepared by RF-Sputtering N.G. Elfadill, M.R. Hashim, K.M. Chahrour and C.S. Wang	120
Deposition of Gold Nanoparticles on Linker-Free Silicon Substrate by Spin-Coating M.S. Gorji, A.R. Khairunisak and K.Y. Cheong	124
The Effect of Crystallinity of Nanoporous WO₃ on the Intercalation and Deintercalation of Li⁺ E. Ahmadi, M.A. Azhar, D.M. Anwar, M. Rozana and Z. Lockman	128
Effect of Annealing Temperature of Hybrid CeO₂/TiO₂ Nanotubes on the Photocurrent M.A. Azhar, M. Rozana, M. de Cunha, D.M. Anwar, E. Ahmadi, A.R. Khairunisak, K.Y. Cheong and Z. Lockman	132
Effects of Graphene Nanoplatelets on Poly(Lactic Acid)/Poly(Ethylene Glycol) Polymer Nanocomposites B.W. Chieng, I.N. Azowa, W.M.Z.W. Yunus and M.Z. Hussein	136
Comparison on Tensile Properties of Graphene and Multi-Walled Carbon Nanotubes/Epoxy Thin Film Composites Z.A. Ghaleb, M. Mariatti, Z.M. Ariff and A.R. Mohamed	140

Chapter 2: Polymer Materials and Composites

Finite Element Analysis and Preliminary Fabrication of Flexible Membrane with Embedded Magnetic Nanoparticles Y. Jumril, M.S. Muzalifah, Y.M. Burhanuddin and B. Bais	147
Cure Kinetics of High Performance Epoxy Molding Compounds C.C. Su, C.F. Yang and C.H. Wei	151
Glass Fibers with Multi-Functional Capabilities for Engineering and Environmental Applications L. Chen, B. Hao and P.C. Ma	155
Influence of Ground Tyre Rubber Devulcanisates on Morphology and Properties of Tread Tyre Formulation A.I.H.H. Dayang, S. Saiwari, W. Dierkes and J.W.M. Noordermeer	159

Preparation of Linear Low-Density Polyethylene-g-Poly(Acrylic Acid)-Co-Starch Hydrogel M. Irani, I. Hanafi and Z. Ahmad	163
A Spectroscopic Study on the Polymer Colour Transition for Indicating the Exposure to Ionizing Radiation M.I. Naurah, M.A.N. Liyana and M.Y. Hamzah	167
Alkali Treatment of Kenaf Fiber Mat and its Influence on the Performance of Unsaturated Polyester/Kenaf Fiber Mat Composites R.M. Taib, D. Ariawan and Z.A.M. Ishak	171
Influence of Mixing Procedure on Properties of Silica Filled Epoxidised Natural Rubber Compounds M.M. Kamal and D.H.A. Asmawi	175
Tensile Properties of Poly(L-Lactic) Acid(PLLA) Blends N. Eawwiboonthanakit, M. Jaafar, Z.A.A. Hamid, M. Todo and B. Lila	179
The Influence of Starch Gelatinization on Mechanical Properties of Natural Rubber Latex Films S.R. Yahya, A.A. Rashid and B. Azahari	184
Effect of Lamination Layers on Tensile Properties and Mould Cleaning Efficiency of Laminated NBR Latex Composite A.A. Rashid, M. Md Sidek and T.S. Chean	189
Chemical Depolymerisation of Natural Rubber in Biphasic Medium I. Suhawati and A. Mustafa	193
The Production of Green Polymer - Hyperbranched Curable Palm Oil Oleic Acid M.Z. Salleh, K. Badri, R. Tajau and N.G. Salleh	197
Effects of Binders System on Sintered Properties of Metal Injection Molding Parts of M2 High Speed Steel R. Sauti, N. Wahab, M.A. Omar and I.N. Ahmad	201

Chapter 3: Functional and Structural Materials, Material Processing Technologies

Tungsten Inert Gas Surface Alloying of Commercial Purity Titanium (CP-Ti) with Fe-C-Si Ternary Mixtures S.A. Adeleke and M.A. Maleque	207
Characterization of Ceramic Tiles Added with EAF Slag Waste P.T. Teo, A.S. Anasyida and M.S. Nurulakmal	211
Optimisation of Pulsed Nd: YAG Laser Processing of Gray Cast Iron for Enhanced Surface Properties F. Fauzun, S.N. Aqida, M.S. Wahab and W. Saidin	215
The Influence of ECAP Pass through Bc Route on Mechanical Properties of Aluminum Alloy 6061 S.V. Yee, Z. Hussain, A.A. Seman, M. Syukron and I.P. Almanar	219
Microstructure, Wettability and IMC Formation of Low-Ag SAC Solder on Cu Substrate M. Kamarudin, M.S. Nurulakmal and A.S. Anasyida	223
Friction Stir Processed of 6061-T6 Aluminum Alloy Reinforced with Silica from Rice Husk Ash H. Zuhailawati, M.N. Halmy, I.P. Almanar and B.K. Dhindaw	227
Solidification of Aluminum Copper Alloy during Twin Roll Strip Casting Z. Hussain, L.M.M. Nasir, A. Abu Seman and B.K. Dhindaw	231
Effect of Feldspar Content on Electric Arc Furnace Slag (EAFS) Added Tiles M. Hasmaliza, A. Abu Seman and W.L. Gan	235
Phase Studies in WC-Stainless Steel AISI 347 Hardmetal System with Graphite Addition Z. Hussain, E.M. Salleh, T.B. Trung and Z.A. Ahmad	239
Hot Press Forming of 22MnB5 Steel Using Full Factorial Design of Experiment (DOE) N. Aziz and S.N. Aqida	243
Preparation of Globular Microstructure Aluminum Alloy Using Cooling Slope Casting as Feed Material for Equal Channel Pressing Process N.V. Thuong, Z. Hussain, A. Abu Seman and T.D. Huy	247

Effect of Grain Refiner on Microstructure of Semi-Solid A356 Aluminium Alloy M.N. Laila Masrur, A.S. Anasyida and H. Zuhailawati	251
Effect of Sintering Duration on Pure PZT for Piezofan Application F.K. Bahanuridin, S.A. Sharif, Z.A. Ahmad and J.J. Mohamed	255
Effect of Different Thickness of Core Layer on Tensile Properties of Laminated Natural Rubber Latex Film M. Md Sidek, A.A. Rashid and B. Azahari	259
Utilization of Sludge from Sidoarjo Mudflow for Zeolite Synthesis C. Salim, N. Prastomo, Y. Shao and H. Hinode	263
Effect of Needle Punching Direction on Nonwoven Fiber Mat to the Mechanical Properties of Kenaf Reinforced Epoxy Composites Produced by Vacuum Assisted Resin Transfer Molding D. Ariawan, Z.A.M. Ishak, R.M. Taib, M.Z. Ahmad Thirmizir and Y.J. Phua	267

Chapter 4: Micro/Nano Materials for Bio/Medical Application

Development of Silver-Coated Gold Nanoparticles and its Conjugation for Labeling on Lateral Flow Immunoassay S.R. Makhsin, K.A. Razak and R. Noordin	273
The Effect of Oxygen Precursor Concentration to the Iron Oxide Nanoparticles Properties for Lateral Flow Immunoassay Application M.N. Noorhashimah, K.A. Razak and R. Noordin	277
Crytallization and Properties of $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-K}_2\text{O-ZrO}_2$ Glass-Ceramics for Dental Applications S.M.A.S.M. Nurddin and M. Selamat	281
The Design of Elastin-Like Polypeptides (ELPs) as a Nanoparticulate-Based Therapeutic and Diagnostic Imaging Agent S.N. Mohd Janib, R.O. Minea, S.D. Swenson, S. Liu, M.K. Pastuszka, F.S. Markland, P.S. Conti, Z. Li and J.A. Mackay	287
Loading and Unloading Properties of Encapsulated Methylene Blue in Silica Nanoparticles for Photodynamic Applications G.N. Makhadmeh, A. Abdul Aziz and K.A. Razak	292
Poly (Vinyl Alcohol) in Fabrication of PLA Micro- and Nanoparticles Using Emulsion and Solvent Evaporation Technique C.Y. Tham, Z.A.A. Hamid, I. Hanafi and Z. Ahmad	296
An <i>In-Situ</i> Functionalization of Decanethiol Monolayer on Thin Silica Coated Superparamagnetic Iron Oxide Nanoparticles Synthesized by Non-Seeded Process S.B. Kayode and A. Abdul Aziz	300
Effect of Ageing Temperature on the Microstructures and Mechanical Properties of Ti-Nb Shape Memory Alloys E. Hamzah, K. Hastuti and J. Hashim	304
Low Young's Modulus β-Ti Alloys for Biomedical Applications A.H.G. Mohamed, I. Mervat and S. Kobayashi	308
Effect of Sintering Temperature on the Diametral Tensile Strength of β-Tricalcium Phosphate Block K.S. Lau and A. Nurazreena	312
Polyethylene Glycol Diacrylate Microgels from Irradiated Micelles H. Yusof, M.I. Naurah and M.A.N. Liyana	316

Chapter 5: Materials and Technologies for Electric and Electronic Application

Effect of Annealing on the Properties of SnSe Film Prepared by Thermal Vacuum Evaporation in the Presence of Argon Gas N. Sabli, Z.A. Talib, M.Y. Wan Mahmood, Z. Zainal, H.S. Hilal and M.S. Husin	323
Polyaniline Binder for Functionalized Acetylene Black: A Hybrid Material for Supercapacitor S. Ajit, S. Palaniappan and S. Gopukumar	327

Dielectric Relaxation in Lanthanide Doped/Based Oxides Used for High-<i>k</i> Layers C.Z. Zhao, S. Taylor, C. Zhao and P.R. Chalker	331
Electrochemical Stability of High Conducting PAN-Based Electrolytes for Lithium Ion Polymer Cells W.G. Chong, K.B. Md Isa, L. Othman, N.H. Zainol, S.M. Samin and Z. Osman	335
The Structure and Electrochemical Performance of $\text{LiNi}_{0.3}\text{Co}_{0.3}\text{Mn}_{0.3}\text{Cr}_{0.1}\text{O}_2$ Cathode Materials R. Roshidah, N. Kamarulzaman, J. Mohd Hilmi, A.R. Azilah, M. Nor Sabirin and H.K. Fun	339
Luminescence of $\text{Sr}_2\text{MgSi}_2\text{O}_7$ Phosphor Prepared by Solid State Reaction S.Y. Pung, C.H. Tan, M.N.A. Fauzi and S.R. Kasim	344
Ionic Transport and Electrochemical Properties of PMMA-Based Gel Polymer Electrolytes for Magnesium Batteries N.H. Zainol, M.Z. Mohd. Halizan, W.G. Chong and Z. Osman	348
Energy Bandgap Engineering of ZnO Using Impurity Elements for Solar Cell Applications: A DFT Study U.H. Bakhtiar, R. Ahmed, A. Shaari and M.Z. bin Yaacob	352
Growth and Characterization of (100) and (111) 3C-SiC Thin Film for MEMS Capacitive Pressure Sensor for Extreme Environments N. Marsi, M. Burhanuddin Yeop, A.A. Hamzah and F. Mohd-Yasin	356
Post-Deposition Annealing in Nitrous Oxide Ambient of RF-Magnetron Sputtered Y_2O_3 Film on Silicon Substrate H.J. Quah and K.Y. Cheong	360
Effects of Post-Deposition Annealing Time on Metal-Organic Decomposed Lanthanum Cerium Oxide Film Spin-Coated on Si Substrate W.F. Lim, Z. Lockman and K.Y. Cheong	364
Synergetic Effect of In and Ag Co-Doped ZnS for Enhanced Photocatalytic Hydrogen Evolution under Visible Light Irradiation M. Kimi, L. Yuliati and M. Shamsuddin	368
Compact and Energy-Efficient Field Emission Cathodes for Sensor Applications R. Schreiner, C. Langer, C. Prommesberger and F. Dams	372
Energy Balance Assessment of Magnetic Materials as Theoretical Hint for Formulation of Interoperable Magnetic-Mechanical Equation A.R. Akbar, M. Awang and D. Sawitri	376
Effect of Thickness of Porphyrin on Electrical Properties of Organic Devices P.L. Tan, G.Y. Yeap, W.S. Chow, R. Schreiner and K.Y. Cheong	381
Silicon Based Thermoelectric Cells with Built in Solar Cells and CNT Composite Based Thermoelectric Cells for Measurement of Gradient of Temperature K.S. Karimov, M. Abid, C.K. Yew, N. Ahmed, M.M. Bashir and S.Z. Abbas	385
Dielectric Properties of BaTiO_3/Epoxy and MWCNT/Epoxy Composites C.L. Poh, M.J. Mustapha, A.F. Mohd Noor, A.R. Mohamed, T.P. Chuah and C.K. Chee	393
Structural and Leaching Properties Study of Ce and Pr Lead Silicate Glasses N.H. Alias, N.M. Isa, M.J.M. Isa, M.H.A.R.M. Ahmad and M.K. Matori	397