

# Table of Contents

## Preface, Committees and Sponsors

## Chapter 1: Novel Composite Materials in Vivid Applications

<b>The Influence Analysis of Stiffness on Stringer Layout and Dimension of Full Composite Wing</b>	
S.J. Qiao, H.S. Gao, F.S. Wang and Z.F. Yue	3
<b>Properties of Epoxy/Carbon Black/Graphite Composites for Bipolar Plate in Polymer Electrolyte Membrane Fuel Cell</b>	
H. Suherman, J. Sahari, A.B. Sulong, S. Astuti and E. Septe	8
<b>The Influence of Alkaline Treatment on Mechanical Properties and Morphology of Rice Husk Fibre Reinforced Polylactic Acid</b>	
A. Farah Dina, S. Siti Zaleha, B. Noor Najmi and I. Nor Azowa	13
<b>Thermal Modulus Evaluation of <i>Arenga pinnata</i> Fibre Reinforced Epoxy Composite: Effect of Moisture Absorption</b>	
A.H. Abdullah, M.R. Mohd Razali and M.A.A. Ghani	18
<b>Wood Shavel Composites with Friendly Environment Based Binder</b>	
J. Endawati and L. Diasti	23
<b>Thermal Insulating Materials for Energy Storage Application</b>	
V. Petránek, L. Nevřivová, D. Zezulova and S. Guziy	30
<b>Surface Treatment of Rubber Toughened Polyester Filled Carbon Black and Kenaf Hybrid Composite</b>	
A.A.M. Redzuan, N.N. Bonnia and N.S. Shuhaimen	36
<b>Preliminary Study of Oil Palm Decanter Cake Natural Polymer Composite (OPDC-NPC)</b>	
M.A. Adam, A. Sulaiman, C.M.S. Said, A.M. Som, A.S. Bahrudin and M.N. Mokhtar	40
<b>Characterization of Nafion/Silica Hybrid Composite Membranes for Redox Flow Battery (RFB) Applications</b>	
Haryadi, Y.B. Gunawan, S.P. Mursid and D. Haryogi	45
<b>Study of Pore Closure Mechanism of Aluminium Composite Processed through Powder Metallurgy Route</b>	
A. Rajeshkannan and B. Sharma	50
<b>Growth of Porous Alumina Layer and Cerium Sealing of Al<sub>7xxx</sub>/SiC Composite for Structural Lightweight Alloy Corrosion Resistant Application</b>	
V. Rizkia, B. Munir, J.W. Soedarsono, B. Suharno and A. Rustandi	55
<b>Damage Size Classification of Natural Fibre Reinforced Composites Using Neural Network</b>	
M. Zaleha, S. Mahzan and I.M. Izwana	60

## Chapter 2: Studies on Corrosion, Coating and Aspects of Chemical Engineering

<b>Densification and Corrosion Studies of as-Sintered-Swaged Al Composite Preforms</b>	
A. Rajeshkannan and A. Sharma	67
<b>Synthesized Hydroxyapatite Powder from Clamshell via Chemical Precipitation Method</b>	
N.H.M. Ali, I. Subuki and M. Hussain Ismail	72
<b>Chemical Properties of Waste Tyre Rubber Granules</b>	
E. Jusli, H.M. Nor, R.P. Jaya and Z. Haron	77
<b>Corrosion Behavior of WC-Co in High Sulphate Content</b>	
I. Azzura	82
<b>Calculating of the Relative Preference of Criteria Affecting Electroless Coating of Alumina Nano Particles on Ni-B by Analytic Hierarchy Process (AHP) Method</b>	
N. Towhidi, S.R. Allahkaram, A. Hekmat and R.F. Alivand	87

<b>Hydrothermal Synthesis and Photocatalytic Properties of BiPO<sub>4</sub>/Ag<sub>3</sub>PO<sub>4</sub> Heterostructure for Phenol Decomposition</b>	
U. Sulaeman, H. Pratiwi, A. Riapanitra, P. Iswanto, S. Yin and T. Sato	92
<b>Laser Cladding of Wear Resistant Stellite 6 Coating on P22 Steel Substrate with Two Different Energy Inputs</b>	
A. Kusmoko, D. Dunne, H.J. Li and D. Nolan	97

### **Chapter 3: Trends in the Development of Nanomaterials, Nanocomposites and Nanotechnology**

<b>Effect of TiO<sub>2</sub> Nanofillers on Mechanical Properties of PVC/ENR/TiO<sub>2</sub> Nanocomposites</b>	
N.A. Ramlee, C.T. Ratnam, N.H. Alias and T.A. Tengku Mohd	105
<b>Effects of UV Radiation and pH of Tannic Acid Solution in the Synthesis of Silver Nanoparticles</b>	
K. Watcharaporn, M. Opaprakasit and V. Pimpan	110
<b>Effects of Processing Method and Nanofiller Size on Mechanical Properties of Biomedical Thermoplastic Polyurethane (TPU) Nanocomposites</b>	
A.F. Osman, G. Edwards and D. Martin	115
<b>Natural Zeolite Incorporated in Zinc Oxide Nanoparticles Doped with Manganese for Degradation of Organic Dye in Water under UV Light Irradiation</b>	
R. Azmi, N.F. Djaja and R. Saleh	120
<b>Hydrothermal Synthesis and Characterisation of Cu Doped TiO<sub>2</sub> Nanotubes for Photocatalytic Degradation of Methyl Orange</b>	
M.H. Razali, M.N. Ahmad-Fauzi, A.R. Mohamed and S. Sreekantan	126
<b>Synthesis and Fabrication of PVA-Ag-Cu and PANI-Ag-Cu Nanocomposite Thin Film Sensor for Detection of <i>E. coli</i> in Water</b>	
H. Abdullah, N.A. Noor Azmy, N. Mohammad Naim, A. Bolhan, A.A. Hamid and S. Shaari	131
<b>Growth of Cobalt Nanowires under External Magnetic Field</b>	
M.D.L. Balela, S. Yagi and E. Matsubara	136

### **Chapter 4: Advances in Materials and Manufacturing Technology**

<b>Evaluation of Matrix and Geometric Strain Hardening of Axial Deformed Sintered Fe-0.75%C Preform</b>	
A. Rajeshkannan, A. Sharma and R.S. Devi	143
<b>New Method of Phase Transformations Calculation in Metals with Structural Features of the Initial and New Phases</b>	
D. Smagulov, A. Amenova and A. Dostayeva	148
<b>Optimization of the Compositions of the High Strength Casting Aluminium Alloys Based on Nickel Eutectic</b>	
A. Amenova and D. Smagulov	152
<b>Experimental Study of Impact Strength of Al-6063 Alloy Processed by Equal Channel Angular Extrusion</b>	
S. Sulaiman, J. Nemati, H.M. Magid, B.T.H.T. Baharudin, G.H. Majzoobi and M.A.A. Hanim	158
<b>Some Aspects on Cold Deformation Characteristics of Sintered Fe-0.8%C-1%Si-0.4%Cu Steel Preforms</b>	
A. Rajeshkannan and V. Hoasirao	163
<b>Diffusion Bonding of Mg/Cu Alloy with Zn Interlayer Metal</b>	
Y.B. Li, T. Lu, L. Cao, Y. Li and T. Zheng	168
<b>The Influence of Fe Additives on Silica Brick Microstructure</b>	
L. Nevřivová, K. Lang and V. Petránek	173
<b>Prediction of Flow Stress Anisotropy and Tension Compression Asymmetry of Hot Rolled AZ31B Mg Alloy</b>	
M. Al-Maharbi and I. Karaman	178
<b>Effect of Barium-to-Strontium on Leakage Current Mechanism of Sol-Gel Ba<sub>x</sub>Sr<sub>1-x</sub>TiO<sub>3</sub> Thin Films</b>	
A.A. Saif, Z.A. Zahid Jamal and P. Poopalan	185

<b>Performance Investigation of Non-Linear Insulator against Surface Tracking on Wind Turbine Blade Surface</b> W. Sasimma and A. Suksri	190
<b>The Effects of Excess Calcium and Aging Media on the Mechanical Properties of Calcium Phosphate Filling Materials</b> A.S.F. Alqap, I. Sopyan and Suryanto	195
<b>The Potential of Starch as an Eco-Friendly Binder in Injection Moulding of 316L Stainless Steel for Medical Devices Applications</b> N. Wahab, M.A. Omar, N.A. Nordin and R. Sauti	200
<b>Deposition of BaZr<sub>0.10</sub>Ti<sub>0.90</sub>O<sub>3</sub> Thin Films Doped Strontium by Sol Gel Method</b> Y. Iriani, D.F. Saputri, S. Hadiati, A.H. Ramelan and V.I. Variani	205
<b>Induction Hardening of Carbon Steel Material: The Effect of Specimen Diameter</b> R. Ismail, D.I. Prasetyo, M. Tauviquirrahman, E. Yohana and A.P. Bayuseno	210
<b>Optimum Heat Treatment of Extrusion Die Steel</b> S.Z. Qamar	215
<b>Modeling and Influence of Machining Parameters on Titanium Alloy</b> J.B. Saedon, N. Jaafar, R. Jaafar, N.H. Saad and M.S. Kasim	220
<b>Evaluation of Thermal Gelation of F-127 in a Non-Aqueous Solvent and its Suitability as a Support Material for Additive Manufacturing</b> M. Fahad, M.A. Khan and M. Gilbert	226
<b>Basic Study on Creep Properties of <i>Eucalyptus</i> Wood</b> Y.R. Ma, X.J. Li, B. Deng and Y.S. Luo	232
<b>Thermal Performance on Unglazed Photovoltaic Thermal Polymer Collector</b> M.A. Mohd Rosli, S. Mat, K. Sopian, M.Y. Sulaiman, E.I. Salleh and M.K.A. Sharif	238
<b>The Effects of Temperature on Rheology Properties and Filtrate after Using Lemongrass as Lost Circulation Materials for Oil Based Drilling Mud</b> N.A. Ghazali, T.A.T. Mohd, N. Alias, M.Z. Shahrudin, A. Sauki and M.B.F. Maliki	243

## Chapter 5: Electrical, Electronic and Optoelectronic Materials: Synthesis and Applications

<b>Microstructure Study on Gd-Doped BaTiO<sub>3</sub> Sol-Gel Multilayer Thin Films Using AFM for Optoelectronic Applications</b> Y.C. Teh, A.A. Saif, Z.A.Z. Jamal and P. Poopalan	251
<b>Intrinsic Ferroelectric Coercive Field Calculation for BZT Films Doped by Indium and Lanthanum</b> M. Hikam and S.R. Adnan	256
<b>Applying the Recovery Voltage Method (RVM) to Study the Degradation of High Power Transformer Insulation</b> D.E. Gavrilă, I. Ciprian and H.C. Gavrilă	260
<b>Platinum-Incorporating Graphene Counter Electrode for In<sub>2</sub>O<sub>3</sub>-Based DSSC with Various Annealing Temperatures</b> H. Abdullah, S. Mahalingam, A. Omar, M.Z. Razali, S. Shaari and I. Asshari	266
<b>Defect Distribution and Yield Analysis Technique on Silicon Wafer</b> W. Praepattarapisut, W. Pengchan, T. Phetchakul and A. Poyai	271
<b>Diamond Microelectrodes for Amperometric Oxygen Sensor</b> S. Cheirsirikul and T. Mongkolkiartichai	276
<b>Materials and Processes in Heat Assisted Magnetic Recording</b> H.C. Gavrilă and D.E. Gavrilă	281

## Chapter 6: Biomaterials and Biotechnology in Different Applications

<b>Characterization and Composition of Oil Extracted from Bastard Poom Beans (<i>Sterculia foetida</i> L) and its Potential as a Biofuel</b> C. Sinthorn, C. Sakkampang and T. Wongwuttanasatian	291
<b>Monitoring of Draft Beer Fermentation Process by Electronic Nose</b> T. Phetchakul and C. Sutthinnet	297

<b>Optimization of Mannose Yield from Deproteinized Palm Kernel Cake via Dilute Fumaric Acid Hydrolysis</b> S.P. Fan, C.H. Chia, Z. Fang, S. Zakaria and K.L. Chee	302
<b>Imidazolium-Based Ionic Liquid Dissolution Influence on Crystallinity of Oil Palm Frond, Oil Palm Trunk and Elephant Grass Lignocellulosic Biomass</b> S.N. Che Kamarudin, S. Ubong, N. Idris, I.S. Azmi, M.S. Jainal, R. Jalil, W.S.A. Wan Omar, T.E.T. Zainal Mulok, N.S. Mohd Safaai and A. Azizan	307
<b>Biogrowth of <i>Escherichia coli</i> in Bio-Ionic Media</b> A.L. Sihab, M. Ramli and A. Azizan	314
<b>Adsorption Capacity of Nickel (II) and Cobalt (II) Ions from Aqueous Solutions by Oil Palm Waste and Sawdust</b> F.A. Fuadi, S.N.I. Nor-Azemi and S.S.A. Syed-Hassan	322
<b>Adsorption of Methyl Violet Dye from Aqueous Solutions by Activated Carbon Produced from Tamarind Seeds</b> P. Phatai, J. Klinkaewnarong and S. Yaiyen	326
<b>Cocoa Pod Husk and Corn Stalk: Alternative Paper Fibres Study on Chemical Characterization and Morphological Structures</b> Z. Daud, H. Awang, A.S. Mohd Kassim, M.Z. Mohd Hatta and A. Mohd Aripin	331
<b>Biodegradable Polymers as Matrices for Control Drug Delivery</b> M. Mucha, I. Socha-Michalak and J. Balcerzak	336
<b>Modulation of Fibrin Gel Extracellular Matrix Properties by Fibrinogen and Thrombin Concentrations for Angiogenesis Assay</b> S.A. Ishak and I. Sukmana	342
<b>Electrokinetics-Based Microfluidic Technology for the Rapid Separation and Concentration of Bacteria/Cells/Biomolecules</b> I.F. Cheng, T.Y. Chen and H.C. Chang	347
<b>Preparation and Characterization of Flexible Polyurethane Foams from Palm Oil-Based Polyol</b> D. Lumcharoen and O. Saravari	352
<b>The Effect of Backbone Disorder on Electrical Conductivity of Poly(dG)-Poly(dC) DNA Molecule at Room Temperature</b> E. Yudiarsah, D.K. Suhendro and R. Saleh	357
<b>A Study on the Hard Wearing UV Treated Photopolymer Printing Plate for Articular Replacement/Arthroplasty (Biomedical)</b> N.A. Rejab, M.S. Yusof, M.I. Maksud and M.N. Nodin	362
<b>Rheological Properties of Hydroxyapatite Synthesized Clamshell Mix with Palm Stearin Binder System</b> I. Subuki, N.H.M. Ali and M.H. Ismail	366

## Chapter 7: Materials and Technologies in Environmental Engineering

<b>Ignition by Thermal Radiation of Polyethylene and Human Feces Combustible Wastes: Time and Temperature to Ignition</b> F.A.F. Monhol and M.F. Martins	373
<b>Discharge Assessment by Using Integrated Hydrologic Model for Environmental Technology Development</b> M.F. Ali, N.F.A. Rahman and K. Khalid	378
<b>A Radical Rethink on Soot Containment from Auto-Rickshaw Exhausts</b> S. Ghosh, R.N. Shah and A. Goenka	383
<b>Potential Utilization of Catalyst for the Combustion of Wood in Households</b> K. Krpec, J. Horák, L. Martiník, P. Kubesa, F. Hopan, Z. Kysučan, J. Kremer and Z. Jankovská	388
<b>The Study of Soil Physical and Chemical Properties in Plant Genetic Protection Area of RSPG, Nampung Dam EGAT, Thailand</b> W. Charoonphong and P. Suwanwaree	393
<b>Physical Contaminants Removal from Continuous Process of Water Filtration by a New Low-Cost Palm Shell Charcoal</b> N.M. Budari, M.F. Ali and J. Kassim	397
<b>Rutting Evaluation of Aged Binder Containing Waste Engine Oil</b> N.H.M. Kamaruddin, M.R. Hainin, N.A. Hassan and M.E. Abdullah	405

<b>Development of Ca(OH)<sub>2</sub> Nanosorbent for Intermediate-High Temperature CO<sub>2</sub> Capture via Wet Chemical Route in N,N-Dimethylformamide Solvent</b> F.D.M. Daud, S. Sreekantan and A.R. Mohamed	410
<b>Novel Aragonite CaCO<sub>3</sub> Adsorbents: Synthesis, Characterization and CO<sub>2</sub> Adsorption</b> N.N. Hlaing, S. Sreekantan, R. Othman, H. Hinode, W. Kurniawan, A.A. Thant, A.R. Mohamed and C. Salime	415
 <b>Chapter 8: Development and Application Novel Materials and Technologies in Civil Engineering</b>	
<b>Enhanced Thermal Stability and Flame Retardancy of a Novel Transparent Poly(Methyl Methacrylate)-Based Copolymer</b> S.H. Jiang, S.M. Lo and Y. Hu	423
<b>Influence of Blast Furnace Slag Content on High Performance Concrete Behavior</b> A. Talah and F. Kharchi	428
<b>Effect of Coarse Aggregate Sizes on Properties of Porous Concrete Paving Blocks</b> A.H. Nur Hidayah, M.N. Hasan and P.J. Ramadhansyah	433
<b>Deflection Behaviour of Irregular-Shaped Polyethylene Terephthalate Fibre Reinforced Concrete Beam</b> J.M. Irwan, R.M. Asyraf, N. Othman, H.B. Koh, A.K. Aeslina, M.M.K. Annas and S.K. Faisal	438
<b>Air Void Characterisation in Porous Asphalt Using X-Ray Computed Tomography</b> N.A. Hassan, M.Z.H. Mahmud and R. Putra Jaya	443
<b>Investigations of Rubber Dipping by-Product on Bitumen Properties</b> M.R. Hainin, M.N.M. Warid, R. Izzul, M.K. Ruzaini and M.Y. Mohd Ibrahim	449
<b>Porous Concrete Pavement Containing Nano-Silica: Pre-Review</b> P.J. Ramadhansyah, M.Y. Mohd Ibrahim, M.R. Hainin, M.N.M. Warid and M.H. Wan Ibrahim	454
<b>Fatigue Life Prediction of Austenitic Type 316L Stainless Steel Using ABAQUS</b> K.A. Mohammad, M.S. Salit, E.S. Zainudin, N.I. Zahari and A. Ali	459
<b>Mechanical Properties of Double Layer Rubberized Concrete Paving Blocks</b> E. Jusli, H.M. Nor, R. Putra Jaya and Z. Haron	463
<b>Information Base for the Optimal Choice of Retaining Structures</b> A. Boukhaled and S. Bouhedja	468
<b>Cracking Propagation of Reinforced Concrete Using Polyethylene Terephthalate (PET) Bottles as Fine Aggregate</b> J.M. Irwan, M.M.K. Annas, A.K. Aeslina, N. Othman, H.B. Koh, R.M. Asyraf and S.K. Faisal	474
<b>Optimized Cost of High Performance Concrete in the Build</b> S. Bouhedja, B. El Kechebour and A. Boukhaled	479
<b>Properties Comparisons and Cost Analysis of Asphaltic Cement Grade 80/100 and 60/70 Modified with Crumb Rubber and SBS Polymer</b> S. Phetcharat	484
<b>Compressive and Flexural Strength of Foamed Concrete Containing Polyolefin Fibers</b> M.H. Wan Ibrahim, N. Jamaludin, J.M. Irwan, P.J. Ramadhansyah and A. Suraya Hani	489
<b>Corrosion of the Pozzolan Concrete in Sulfates</b> A. Merida and F. Kharchi	494
<b>Failure Prediction of Normally Consolidated Clays Using Stress Paths of Consolidated Undrained Tests</b> J.R. Kim, G. Zhumabekov, D. Bakhtiyarov and D. Saliyev	499
<b>An Empirical Study on Time Lag Phenomenon Regarding Summertime Indoor Thermal Environments in the Domestic Buildings of Different Construction Types in Hot-Humid Climate Zone</b> H.R. Hsieh, W.Y. Chen and H. Yu	504