

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Metallurgy

Non-Isothermal Kinetic Modelling for Hydrogen Reduction of Ferric Oxide Using Matlab N.S. binti Che Ibrahim, S. Ramakrishan, S.A. Rezan, N. binti Baharun, R. Alizadeh and P. Roohi	3
Influence of Semi-Solid Casting and Equal Channel Pressing on Microstructure of a Hypoeutectic Al-Si Alloy V.T. Nguyen, H. Zuhailawati, A.S. Anasyida, T.D. Huy and I.P. Almanar	9
The Role of Roller Speed on Solidification of Al-Mg-Si Alloy during Twin Roll Strip Casting H. Zuhailawati, M.M. Yusof, A.S. Anasyida, I.P. Almanar and B.K. Dhindaw	15
The Effects of Rolling Deformation and Annealing Treatment on Damping Capacity of 1200 Aluminium Alloy M. Mohd Noor, S.B. Jamaludin, Y. Yasmin, S.R. Shamsudin, M.S. Risby and M. Afendi	20
Microstructure Evolution of Conventional and Semi-Solid Cast of A356 Aluminium Alloy with Addition of Inoculant M.N. Laila Masrur, M. Syukron, H. Zuhailawati and A.S. Anasyida	25
Reduction Behaviour of Iron Ores by Agricultural Waste Chars N.F.M. Yunos, N.A. Aziz, A.N. Ismail and M.A. Idris	31

Chapter 2: Steels and Alloys

Effect of Solution Treatment Temperature on Tensile Strength of Al-Mg-Si Alloy S.B. Jamaludin, M.H. Abdullah, M.N. Mazlee and K. Hussin	39
Joining Dissimilar Metals between Steel and Aluminum by TIG Welding S.B. Jamaludin, M.Z. Abd Latif, M. Mohd Noor and K. Hussin	45
Effect of Aging Time to the Commercial Aluminum Alloy Modified with Zirconium Addition Z. Mohd Syukry and A.B. Ismail	50
Effect of Filler Metals on the Microstructures and Mechanical Properties of Dissimilar Low Carbon Steel and 316L Stainless Steel Welded Joints M.F. Mamat, E. Hamzah, Z. Ibrahim, R.A. Majid and A. Bahador	57
Effect of Aluminium and Silicon to IMC Formation in Low Ag-SAC Solder M. Kamarudin, A.S. Anasyida and N. Mohd Sharif	63

Chapter 3: Surface and Coating

Effect of Cooling Rate on the Corrosion Behaviour of Zn-Al and Zn-Al-Mg Alloy H.T. Low, E. Hamzah, S. Farahany, H.R. Bakhsheshi-Rad and M.H. Cho	71
Wear Behaviour of TiC Coated AISI 4340 Steel Produced by TIG Surface Melting M.A. Maleque, B.A. Ghazal, Y.A. Mohammad, M. Hayyan and A.S. Ahmed	76
Preliminary Study: Direct Growth Carbon Nanomaterials on Metal Substrate to Improve Corrosion Resistance A.N. Edzatty, A.H. Norzilal and S.B. Jamaludin	81
Corrosion Behavior of WC-Co Cermet Coatings Z. Kamdi, C.Y. Phang and H. Ahmad	87
The Microstructure and Mechanical Properties of Al/Al₂O₃ Surface Composite Layer Produced by FSP Green Technique K.S. Mohammed, H.I. Dawood and M. Darus Daud	91
Effect of Complexing Agent in Ni-P Coating on Cu Substrate M.S. Nur Ariffah, N. Mohd Sharif, A.S. Anasyida and E.K. Shiu	97

The Effect of Applied Voltage and Anodisation Time on Anodized Aluminum Oxide Nanostructures	
A.H. Mahmud, A.S. Habiballah and A.M.M. Jani	103
Nanocomposite TiAlBN Coatings as a Corrosion Protection Layer for AZ91 Mg Alloy Substrate in NaCl	
M.R. Zulkifli, M. Zaimi, J.M. Juoi and Z. Mahamud	109

Chapter 4: Ceramics

Synthesis of Polycrystalline LaYO₃ with Different Sintering Temperature	
N.A. Shafiq, M.S. Idris, C.A. Salmie Suhana, R.A.M. Osman and T.Q. Tan	117
The Effects of Fly Ash Addition on the Properties of Porous Clay-Fly Ash Composites	
W.H. Chan, M. Mohd Noor, Z.A. Ahmad, S.B. Jamaludin and M.A.M. Ishak	123
A Study on Densification and Grain Growth of Ba(Ce,Zr)O₃ Prepared by a Two-Step Sintering	
N.W. Othman, A. Ramli, N. Osman, S.S.C. Abdullah and M.E.A. Rahman	129
Effect of Mould Pressure and Substitution of Quartz by Rice Husk Ash on the Bulk Density and Compressive Strength of Porcelain Body	
H.U. Jamo, M.Z. Noh and Z.A. Ahmad	134
Effect of Surfactant on the Thermal Behavior of Cerate-Zirconate Ceramic Powder Prepared by Modified Sol-Gel Method	
N.A. Mazlan, N. Osman, M.H. Yaakob and A.M.M. Jani	140
Effect of Corn Starch and Potato Starch as the Pore Forming Agent to the Structure of Porous Cordierite	
H. Mohamad and Y.M. Lim	146

Chapter 5: Materials for Electronic and Electrical Industry

The Effect of Synthesis Temperature on Interlayer Mixing in Layered Rock Salt Cathode Materials LiNi_{0.7}Mn_{0.1}Co_{0.2}O₂ for Li-Ion Batteries Application	
S.P. Soo, M.S. Idris, R.A.M. Osman and A. Rahmat	155
The Effect of Micron-Size Silicon Additions on Microstructure, Microhardness and Thermal Properties of Sn-Cu-Ni Solder Alloy	
M.I. Izwan Ramli, N. Saud, M.A.A. Mohd Salleh, M.N. Derman, R.M. Said and N. Nasir	161
Effect of Si₃N₄ Addition on the Properties of Sn-1.0Ag-0.7Cu Solder Alloy	
N.M. Nasir, N. Saud, M.A.A. Mohd Salleh, M.N.B. Derman, M.I. Izwan Ramli and R.M. Said	167
Review on Preparation and Properties of High-K Dielectric Material Based on Lanthanum Doped Barium Titanate	
N.F. Abdul Hamid, R.A.M. Osman, M.S. Idris and M.R. Zakaria	173
Characterisation of Cation Ordering in Layered Rock-Salt LiNi_{1/3}Mn_{1/3}Co_{1/3}O₂ Cathode Material for Lithium Ion Batteries	
T.Q. Tan, R.A.M. Osman and M.S. Idris	179
Single-Walled Carbon Nanotubes – Graphene Mixture as a Dye Monolayer for Dye-Sensitized Solar Cells	
M.R. Muda, S.S. Mat Isa, A.F. Hasan and M.M. Ramli	185
Effects of Annealing on the Properties of Copper Oxide Thin Films	
D.S. Che Halin, I.A. Talib, A.R. Daud and M.A.A. Hamid	189
Significant Influences of Co-Doping Ag and Sb on Electrical Properties and Thermoelectric Applications of AgPb_mSbTe_{m+2} Compounds Synthesized Using Solid State Microwave Technique	
A. Hmood, A. Kadhim and H.A. Hassan	193
Studied on Structural Characterization of Lanthanum Doped Barium Titanium Ceramics	
N.F. Abdul Hamid, R.A.M. Osman, M.S. Idris and T.Q. Tan	198
Modeling the Effect of ARC and other Parameters on the Efficiency of GaAs Solar Cell Using Silvaco	
L.K. Sai, R.A.M. Osman and M.S. Idris	204

Estimation of Material Damping Coefficients of AlN for Film Bulk Acoustic Wave Resonator	
N.I.M. Nor, N. Khalid, R.A.M. Osman and Z. Sauli	209
Thermal Annealing Effect on Properties of Zn Foils Substrates	
L.S. Chuah and Z. Hassan	215
Sic-Reinforced Aluminum-Silicon Composite via Pressureless Infiltration Using Polystyrene as External Binder for Electronic Assemblies	
N.N. Mohd Salim, H. Zuhailawati, H. Mohamad and A.S. Anasyida	220
Nanocrystal TiO₂ Engulfed SiO₂-Barium Hexaferrite for Enhanced Electrons Mobility and Solar Harvesting Potential	
A. Abd Aziz, S. Ibrahim and P. Saravanan	226
Synthesis and Characterisation of Li_{1-x}Na_xNi_{1/3}Co_{1/3}Mn_{1/3}O₂ as Cathode Materials for Rechargeable Lithium Batteries	
Z. Abdullah, R.A.M. Osman, S.P. Soo, N. Farahin and M.S. Idris	232

Chapter 6: Polymers and Composites

Effects of Compatibilizer on Thermal and Mechanical Properties of PLA/NR Blends	
N.S. Abdullah Sani, A. Arsad, A.R. Rahmat and N.N.B. Mohammad	241
Compression Test and Energy Absorption of Polyurethane/Multi Walled Carbon Nanotubes Foam Composites	
A.A. Sinar, Z. Firuz, M.A. Nur Azni, N.H. Ahmad Zaidi, M.A. Hazizan and H.A. Sahrim	246
Crystallinity and Morphological of Cellulose Extraction from <i>Elaeis guineensis</i> Jacquin Frond	
M. Muhammad Safwan, H.L. Ong and H.M. Akil	251
Kenaf-Unsaturated Polyester Composite: The Effect of Different Retting Process of Kenaf Bast Fiber on the Mechanical Properties	
A.R. Rozyanty, M.Y. Nur Firdaus, T.Z. Liew and N.F.M. Yunus	256
A Comparative Study of Metal Oxides (CaO, CuO and CaO/CuO) Effects on the Morphology and Thermal Stability of PANI Nanofibers	
M.M. Rahman Khan, W.A.K. Mahmood, Y.K. Wee and H. binti Azizan	262
Wear Properties of Metal Matrix Composite Al-Cu and Al-Cu-TiB₂	
R. Rosmamuhamadani, S. Sulaiman, M.I.S. Ismail, M.A. Azmah Hanim and M. Talari	268
Effect of Microwave and Conventional Heating on Sintering Behavior of Cu-10vol.%SiC Nanocomposites	
N. Bashirom and K.W. Kit	274
Nanostructured WO₃ – Synthesis and Properties	
L.S. Chuah and G. Tang	280
Effects of Maleated Natural Rubber on Mechanical Properties of Polylactic Acid/Natural Rubber Blends	
N.N.B. Mohammad, A. Arsad, A.R. Rahmat and N.S. Abdullah Sani	284
Epoxy Layered Silicates with Fly Ash-Based Geopolymer: Flexural Properties	
Y. Mat Daud, K. Hussin, C.M. Ruzaidi, A.F. Osman, M. Al-Bakri and M. Binhussain	290
Tensile and Flexural Strength of Untreated Napier Grass Fibre/Polyester Composites	
J.A.M. Haameem, M.S. Abdul Majid, M. Afendi, M. Haslan Fadli, E.A. Helmi and I. Fahmi	295

Chapter 7: Materials for Biomedical Application

Corrosion Performance of Nitrided Based Coating on AZ91 Mg Alloy in Hank's Solution	
M.R. Zulkifli, M. Zaimi, J.M. Juoi and Z. Mahamud	303
Fabrication and Characterization of Different Ca Content in Mg-Ca Composite Using Powder Metallurgy Technique	
M.S. Syaza Nabilla, C.D. Zuraidawani and M.N.B. Derman	309
The Effect of Zn Concentration on the Corrosion Behavior of the Composite Magnesium-10wt.% Bio-Glass	
S.A. Buyong, S.B. Jamaludin and R. Abdul Malik	314

Microstructure and Compressive Strength of Magnesium-Zinc Alloy Reinforced with Different Percentage of Bio-Glass Content M.A.F. Zaludin and S.B. Jamaludin	319
The Effect of Sintering Temperature on the Sintered Mg/3wt.%Zn-Bioglass (45S5) Composites N.A. Llah, S.B. Jamaludin and Z. Che Daud	325
Microstructural and Corrosion Behavior of Biodegradable Magnesium Alloys for Biomedical Implant H.Y. Tok, E. Hamzah and H.R. Bakhsheshi-Rad	331
Biomedical Applications: Composite Metal Alloys with Additives R. Abdullah, N.M.S. Adzali and Z. Che Daud	337
Design of Experiment (DOE) Study of Hydroxyapatite-Coated Magnesium by Cold Spray Deposition M.R. Hasniyati, H. Zuhailawati, S. Ramakrishnan, B.K. Dhindaw and S.N.F. Mohd Noor	341
Effects of Surface Treatment on Titanium Alloys Substrate by Acid Etching for Dental Implant A. Jemat, M.J. Ghazali, M. Razali and Y. Otsuka	347
Pore Characteristics of Mesoporous Carbonated Hydroxyapatite Synthesised with Different Nonionic Surfactant and Carbonate Concentration N.F. Mohammad, R. Othman and F.Y. Yeoh	353
The Development of Macroporous PEG-Based Hydrogel Scaffolds for Tissue Engineering Applications Z.A.A. Hamid, H. Ismail and Z. Ahmad	361
A Short Review on <i>In Vitro</i> Bioactivity Behavior of Magnesium Composites N. Ab Llah, S.B. Jamaludin and Z. Che Daud	367
Influence of Alginate Concentration on the Diametral Tensile Strength of Hydroxyapatite (HAp) Block A. Nurazreena, C.Z. Ann and M. Mustapha	373

Chapter 8: Materials in Environmental Engineering and Construction

Influence of Recycled Wastes on Slag Foaming during EAF Steelmaking A.N. Ismail, N.F.M. Yunus, S.B. Jamaludin and M. Asri Idris	381
Response of Armour Plate Subjected to Blast Loading Based on Analytical Model of Second Order Single Degree of Freedom A.Z. Ahmad Mujahid, M.F.S. Koslan and O. Mohd Zaid	387
Reactions of Limestone on the Slaking Process under Different Conditions of Parameters D. Mohd Darus, H. Aimi Noorliyana, R. Azmi and H. Kamarudin	393
Effects of Quarry Dust as Partial Sand Replacement on Compressive Strength and Crack Profile of Cement Composites M. Madzura, M. Mohd Noor and S.B. Jamaludin	399
Synthesis and Morphological Characterization of Gold Nanoparticles (AuNPs) Supported on Anodized Titanium Oxide (TiO₂) Nanotubes A.S. Habiballah, A.H. Mahmud, H. Yazid and A.M.M. Jani	405
The Effects of Hydrothermal Ageing on the Crushing Behavior of Glass/Epoxy Composite Pipes S.N. Fitriah, M.S. Abdul Majid, R. Daud, M. Afendi and Z.S. Nazirah	411
Comparative Study of Small Scale Soil Barrier Subjected to Air Blast Load by Using AUTODYN 2D and AUTODYN 3D J. Jestin, A. Faisal, A.Z. Ahmad Mujahid and O. Mohd Zaid	417
Characterization of Hematite Nanoparticles (Fe₂O₃) Produced by High Energy Milling for Dye Removal Catalyst A. Roshaida and N. Baharun	423
Ammonia Gas Sensor Based on Chitosan Biopolymer D.S. Chandrasakaran, I. Nainggolan, T. Ikhsan and M.N.B. Derman	429

Chapter 9: Materials and Technologies of Processing in Mechanical Engineering

Strength of Adhesive T-Joint under Moisture Condition

S. Nurhashima, M. Afendi, B. Izzawati, A. Nor, A.R. Abdullah, N.A.M. Amin, M.S. Abdul Majid and R. Daud

437

Strength of Adhesive T-Joint in Granulator Fluidization Bed at Elevated Temperature

B. Izzawati, M. Afendi, S. Nurhashima, A. Nor, A.R. Abdullah, R. Daud and M.S. Abdul Majid

443

A Study on the Impact of the Milling Parameters on the Surface Roughness when Using Polyurethane Board as a Base Material in Manufacturing Automotive Checking Fixtures

L.D.K. Catherine, R.A. Raja Ma'arof and S. Suresh

449

Simulation Study on Failure of Constant Force Spring (CFS) Fitted in a Counter Balancinglinkage Mechanism

H.K. Khairul, A.Z. Ahmad Mujahid, A. Shohaimi, M.F.S. Koslan, T. Suresh, W.M. Wan Ali, H. Firdaus, J. Hariz and O. Mohd Zaid

455

Visual Inspection on Failure Surface of Constant Force Spring (CFS) Fitted in a Counterweight Balancing Mechanism

H.K. Khairul, A.Z. Ahmad Mujahid, A. Shohaimi, S. Md Fuad, T. Suresh, H. Firdaus, J. Hariz, W.M. Wan Ali and O. Mohd Zaid

461

Failure Analysis of Crane Wire Rope

S.R. Shamsudin, M. Harun, M. Mohd Noor, A. Rahmat and R. Abdul Malek

467