

# Table of Contents

## Preface

## Chapter 1: Engineering Tribology and Surface Engineering

|                                                                                                                                                                                       |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Friction and Wear Properties of Oriented Fe<sub>2</sub>B with Different Cr Additions under Water-Lubricated Condition</b><br>K.M. Li, Z.F. Huang, C.F. Qin, H.W. Ma and W.Y. Zhang | 3  |
| <b>Simulation Study on Erosion Wear Rule of Aluminium Brass Throttling Ring of Artillery Based on Finite Element Method</b><br>K.B. Cui, H.T. Sun, Y.C. Jiang and Y.P. Huang          | 9  |
| <b>Metal Magnetic Memory Testing of the Drilling Riser Pipeline Steel Based on Pulsating-Impact-Fatigue Test</b><br>W. Zhou, J.C. Fan, X.Y. Liu and S.J. Liu                          | 15 |
| <b>Numerical Simulation and Experimental Verification of Ultra-High Frequency Induction Cladding with Metal Wire</b><br>Z.F. Bing, Y.J. Shi, R. Sun and Y.K. Guo                      | 25 |
| <b>6061 Aluminum Surface Treatment by High Quality Coloring Anodic Film</b><br>C.C. Lee, S. El-Zahlanieh, Y.H. Wang, C.C. Chen, S.H. Chen and Y.W. Chang                              | 31 |
| <b>Optimized Micro-Arc Oxidation Coating Thickness on ALZ Magnesium Lithium Alloy</b><br>L.H.T. Do, S.J. Lee, D.B. Luu, Q.B. Tao, N.T. Vo and T.N. Ngo                                | 37 |

## Chapter 2: Steel and Alloys

|                                                                                                                                                                                                             |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>A Study on Fabrication and Morphology of 6061 Aluminum Alloy in Hard Anodization</b><br>S.F. Chang, S. El-Zahlanieh, C.C. Chen, C.Y. Chen, Y.W. Chang, C.W. Hun, M.H. Cho, C.S. Lee and S.H. Chen        | 45 |
| <b>The Microstructure Evolution and Precipitation Behavior within HSLA Steels with Different M/C Atomic Ratios</b><br>C.Y. Chen, L.J. Chiang, C.C. Chen, J.S. Kuo and Y.H. Chou                             | 49 |
| <b>Studying of Influence of Rotation of the Spent Electrode on the Microfirmness of the Received Preparation of Steel AISI 420 at Electroslag Remelting</b><br>A.N. Anikeev, I.V. Chumanov and D.V. Sergeev | 55 |
| <b>Study of TiC Interaction and its Reaction Products with the Different Carbon Content Steels</b><br>A.N. Anikeev, I.V. Chumanov and V. Sedukhin                                                           | 59 |

## Chapter 3: Biomaterials and Materials for Environmental Engineering

|                                                                                                                                                                                                       |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Analysis of the Influence of Pore-Forming Agent and Coagulation Bath on the Preparation of PES Hollow Fiber Membrane</b><br>Q.Y. Jia, W.T. Sun, S.X. Liu, X. Gao, L.L. Li and C.X. Hu              | 67 |
| <b>Development Carbonated Hydroxyapatite Powders from Oyster Shells (<i>Crassostrea gigas</i>) by Carbonate Content Variations</b><br>A. Almukarramah and Y. Yusuf                                    | 76 |
| <b>Carbonated Hydroxyapatite Derived from Snail Shells (<i>Pilla ampulacea</i>): The Influence of Sintering Temperature on Purity and Crystallography Properties</b><br>I.K. Januariyasa and Y. Yusuf | 82 |
| <b>Strength and Bioactivity of Hydroxyapatite/White Portland Cement (HAp/WPC) under Simulated Body Fluid (SBF) Solution</b><br>W. Taptimdee, P. Chindaprasirt, Y. Otsuka, Y. Mutoh and T. Laonapakul  | 88 |
| <b>Adsorption of Metalworking Fluids in CSTR Reactor by Modified Sugarcane Bagasse with Aluminium Sulphate as Adsorbent</b><br>J. Meteewonnakul, K. Piyamongkala and N. Pongstabodee                  | 94 |

## Chapter 4: Nanomaterials and Nanotechnologies

|                                                                                                                                                                     |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Anti-Buckling Design of Rectangular Thin Plate Based on Local Surface Nanocrystallization</b>                                                                    |     |
| Z.B. Lian, Z. Zhao, W. Xu, C.W. Lim, X.S. Xu and Z.H. Zhou                                                                                                          | 103 |
| <b>Energy Absorption Analysis and Optimization Design of Local Surface Nanocrystallization Rectangular Tubes</b>                                                    |     |
| Z. Zhao, W. Wang, Y.L. Chen, Z.H. Zhou, C.W. Lim and X.S. Xu                                                                                                        | 109 |
| <b>Removal of Methylene Blue Dye Using Metal-Free g-C<sub>3</sub>N<sub>4</sub> Photocatalyst over Natural Sunlight Irradiation</b>                                  |     |
| C. Sriwong and K. Choojun                                                                                                                                           | 115 |
| <b>Flexural Wave Propagation of Double-Layered Graphene Sheets Based on the Hamiltonian System</b>                                                                  |     |
| C.H. Xu, J.J. Hu and D.L. Rong                                                                                                                                      | 121 |
| <b>Nickel Cobaltite Nanoneedle/Porous Graphene Nanosheets Network Nanocomposite Electrodes with Ultra-High Specific Capacitance for Energy Storage Applications</b> |     |
| C.C. Yang, C. Lee and T.Y. Tseng                                                                                                                                    | 127 |
| <b>Microwave Absorption Properties of Porous Co/C Nanofibers Synthesized by Electrospinning</b>                                                                     |     |
| H.T. Sun, S. Zhang, H.Y. Deng, K.B. Cui and F. Zhao                                                                                                                 | 133 |
| <b>Literature Review of Gallium: Conductive Ink Alternative?</b>                                                                                                    |     |
| A.D. Aguilar-Banegas, F.D. Reyes-Cruz, J.A. Vargas-Pineda and C.H. Ortega-Jimenez                                                                                   | 139 |

## Chapter 5: Composite Materials

|                                                                                                                                                            |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Utility of Air-Entraining Additive in the Development of Lightweight Alumina-Based Refractories</b>                                                     |     |
| M. Jogl and P. Reiterman                                                                                                                                   | 147 |
| <b>Tribological Properties of Carbon Fiber Epoxy Resin Composite and Polyimide Material at High and Low Temperatures</b>                                   |     |
| Y. Zhang, G.D. Chen and L. Wang                                                                                                                            | 153 |
| <b>Numerical Study on Axial Crushing of Auxetic Foam-Filled Square Tube</b>                                                                                |     |
| S. Mohsenizadeh, Z. Ahmad and A. Alias                                                                                                                     | 159 |
| <b>Direct Recycling of Aluminium Chips into Composite Reinforced with <i>In Situ</i> Alumina Enrichment</b>                                                |     |
| A. Wagiman, M.S. Mustapa, M.A. Lajis, S. Shamsudin, M.I.M. Masirin and M.H. Rady                                                                           | 165 |
| <b>Hybrid Effect of ZrB<sub>2</sub>+Si<sub>3</sub>N<sub>4</sub> on the Microstructure and Mechanical Properties of AA8011 for Service Life Improvement</b> |     |
| J. Fayomi, A.P.I. Popoola and O.M. Popoola                                                                                                                 | 171 |
| <b>Effect of Heat Treatment Process on the Hardness of Aluminium356/Silicon Carbide Particulate Composites</b>                                             |     |
| S. Salyajivin and S. Talangkun                                                                                                                             | 176 |
| <b>An Application of Reinforced Polyurethane Foam in Design of the Common Bulkhead for Cryogenic Tanks</b>                                                 |     |
| K.C. Li, Z.J. Wu, M.J. Liu, X.S. Xu and W. Xu                                                                                                              | 182 |

## Chapter 6: Civil Engineering Materials

|                                                                                                                          |     |
|--------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Adapting ANFIS to Improve Field Rebound Hammer Test for Concrete Compressive Strength Estimation</b>                  |     |
| Y.R. Wang, D.L. Chiang and Y.J. Chen                                                                                     | 191 |
| <b>Analysis of Physical and Microstructural Properties on Parit Nipah Peat Particles as Sustainable Asphalt Modifier</b> |     |
| M.I.M. Masirin, A.S.B. Ali, M.S. Mustapa, R.A. Rahman, A. Wagiman and M.I. Aziz                                          | 197 |
| <b>A Characteristic and a Precisely Constitutive Model for Undrained Clay</b>                                            |     |
| S.T. Hsu, W.C. Hu, Y.H. Lin and Z. Ling                                                                                  | 203 |

**Appraisal on Different Sustainable Road Stabilization Techniques for Different Road Condition and Materials**

M.I.M. Masirin, H.A. Hamid, R.A. Rahman, A. Wagiman, M.S. Mustapa and N.A. Hamid

208

**Chapter 7: Materials Processing and Forming**

**Size Effect of Drill Bit on Coupled Vibrations during High Speed Micro-Drilling Process of Composite Printed Circuit Board**

H.T. Dat, V.D. Nguyen, H.A. Nguyen, N.K. Nguyen, H.T.H. Yen and D.T. Nguyen

217

**Effects of Former Surface Treatment on Natural Rubber Latex Deposition**

K.W.I. Se Hoo, L.J. Yu, K.S.J. Shyam, A.C. Ong and L.Y.G. Lai

223

**Effect of Hot Extrusion Parameters on Tensile Strength and Fracture Behavior in Direct Recycling of Aluminium Alloy (6061) Chips**

M.H. Rady, M.S. Mustapa, S. Shamsudin, M.A. Lajis, M.I.M. Masirin and A. Wagiman

229

**Optimization of Material Removal Rate and Dimensional Errors in Subtractive Rapid Prototyping of Polycarbonate Material**

J. Suteja and M.A. Hadiyat

235

**Numerical and Experimental Analysis on Runner and Gate Positioning for Magnesium Alloy Die-Casted Test Piece**

M.D. Ibrahim, G.L. Tan, L. Roslan, Y. Kashiwabara, J. Jendia and Y. Sunami

242