

# Table of Contents

## Preface

## Chapter 1: Materials for Functional and Specialised Applications

|                                                                                                                                                                                                                           |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Investigation of Electromechanical Properties of CF Monolayer</b><br>T.H. Dinh, H.L. Nguyen, T.Q. Tran and V.T. Do                                                                                                     | 3  |
| <b>Microwave Absorption Performance of Durian-Husk-Derived Carbon Nanomaterials</b><br>Q.D. Tran, X.Q. Pham, T.T. Nguyen, D.V. Le, N.L. Nguyen, N.H. Ngo, T.A. Vu, V.H. Nguyen,<br>V.T. Nguyen and T.A.X. Chu             | 9  |
| <b>Selective Carbon Monoxide-Gas-Sensing Properties over CuO/Rb<sub>2</sub>CO<sub>3</sub> Nanohybrid Structure</b><br>M.H. Nguyen, V.H. Nguyen, T.H. Pham, D.H. Phung and M.H. Nguyen                                     | 17 |
| <b>Study of Localization-Delocalization Transition of Light in Photonic Moiré Lattices Fabricated with Saturable Nonlinear Materials</b><br>T.D. Ngo, C.C. Duong, L.T. Nguyen, T.L. Nguyen, D.A.Q. Nguyen and V.H. Nguyen | 28 |
| <b>Spatial Solitons in Moiré Photonic Lattices in Cubic-Quintic Competing Nonlinear Material</b><br>T.L. Nguyen, T.D. Nguyen, T.H. Tran, T.D. Ngo, D.T. Do and V.H. Nguyen                                                | 34 |

## Chapter 2: Properties of Structural Metals

|                                                                                                                                                                                                                                    |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>The Effect of Heat Treatment on Microstructure and Mechanical Properties of FeCoNiAl<sub>0.25</sub>Mn<sub>0.75</sub> High Entropy Alloy</b><br>L.M. Duc, N.H. Hai, N.V. Duong, N.T. Hung, N.K. Giang, H.V. Vuong and P.M. Khanh | 43 |
| <b>Degradation of Pipeline Steel's Strength under High Temperature and Load due to Cavity Formation</b><br>C.S. Nguyen, T.H. Nguyen and A.H. Bui                                                                                   | 52 |
| <b>Comparative Analysis of Microstructure in Ferritic Steel Fabricated by Conventional and Additive Manufacturing Processes</b><br>M.T. Nguyen                                                                                     | 58 |

## Chapter 3: Polymer Materials

|                                                                                                                                                                                      |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Exploring Peculiar Properties of Graded Rubber</b><br>Q.V. Do and M. Yamaguchi                                                                                                    | 71 |
| <b>The Synergistic Effects of Expandable Graphite and Ammonium Polyphosphate on the Properties of Flame-Retardant Nitrile Butadiene Rubber</b><br>N.T. Liem, N.D. Long and D.V. Diep | 79 |
| <b>Edible Plastics/Films or Biopolymers from Food Materials</b><br>N.T.H. Thao, D.V. Hung, N.T.M. Tu and L.H. Nga                                                                    | 89 |
| <b>Stable Fabrication of Chitosan/Polycaprolactone (CS/PCL) Core-Shell Nanofibers by Electrospinning</b><br>H.N. Phuong, D.N. Thu, N.T. Liem and V.A. Doan                           | 98 |

## Chapter 4: Materials for Biomedical Application

|                                                                                                                                                                                                                                              |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Fabrication of Carbonate Apatite Bone Substitute Coating on Titanium and its Initial Cellular Response</b><br>D.H. Nguyen, D.L. Bui, A.S. Nguyen and T.B. Le                                                                              | 109 |
| <b>Porosity and Mechanical Properties of Porous Ti by Spark Plasma Sintering under Different Applied Produced Pressures</b><br>V.H. Pham, N.K.K. Linh, N.T. Ngoc, T.A. Nguyen, T.Q. Nguyen, T.T. Le, T.T.T. Nguyen, V.H. Pham and D.Q. Khanh | 115 |

|                                                                                                                                                                                                                  |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Study on Coating of TiO<sub>2</sub> Nanotubes on Microporous Ti Surfaces for Biomedical Applications</b><br>V.C. Manh, D.M. Duc, D.Q. Khanh, D.H. Bach, N.D. Trung Kien, M.X. Dung, T.Q. Phong and V.H. Pham  | 127 |
| <b>Influence of Current Density on the Morphology and Structure of Silver Nanoparticles on Anodized Titanium for Biomedical Implant Applications</b><br>V.H. Pham, D.M. Duc, N.D. Hung, L.T.T. Lan and L.V. Toan | 136 |
| <b>Synthesis CaTiO<sub>3</sub>: Er<sup>3+</sup> Films on Titanium by Anodization and Hydrothermal Method for Drug Delivery Applications</b><br>N.T.T. Tuyen, L.T.T. Lan and V.H. Pham                            | 144 |

## **Chapter 5: Materials and Technologies of Textile and Apparel Production**

|                                                                                                                                                                                        |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Dyeability of Cotton Fabric with Extract from Bougainvillea Glabra</b><br>T.A. Nguyen, B.T. Dang Ngoc and K.N. Tran                                                                 | 153 |
| <b>The Effect of Cotton Fiber Characteristics Tested by Uster H.V.I on Yarn Properties</b><br>S.P. Nguyen and D.T. Vu                                                                  | 160 |
| <b>Research of Warp Structure Modelling for Calculation of Two Guidebars Warp Knitted Fabric Parameters</b><br>D.H. Chu                                                                | 168 |
| <b>Research on Shape Memory Behaviour of Rib Knitted Fabric from Wool Yarn Descaled by Ultrasonic Wave</b><br>T.C.T. Dao, D.V.M. Phuong, N.T. Phuong and D.H. Chu                      | 176 |
| <b>Research upon Self-Cleaning Ability of Organic Stains on TiO<sub>2</sub> Coated Cotton Fabric under Different Light Conditions</b><br>T.T. Ngat, N.M. Tuan, N.V. Toan and D.N. Phan | 184 |
| <b>Research upon Ag-Doped ZnO Nanoparticles Coated on Cotton Fabric for Antibacterial Boxer Briefs Underwear</b><br>T.T. Ngat, N.V. Toan, N.T. Nguyen, D.N. Phan and T.M.K. Tran       | 192 |

## **Chapter 6: Measurements and Software for Production Providing**

|                                                                                                                                                                                                   |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Development of an Open-Source Software Tool for Microstructure Analysis of Materials Using Artificial Intelligence</b><br>G.K. Pham, K. Yalcin, A.W.A.N. Binti Wan, A.S. Nguyen and V.T. Trinh | 203 |
| <b>Design and Manufacture an Instrument Used to Estimate the Sun's Ultraviolet Radiation</b><br>T.T.A. Dao, N.M.T. Thao and H.V. Tri                                                              | 211 |
| <b>Application of 3D Simulation Techniques and Tecnomatix Software in Balancing the Sewing Lines in the Garment Industry</b><br>P.T. Thao, P.T.Q. Trang and T.D. Vu                               | 217 |

## **Chapter 7: Waste Recycling**

|                                                                                                                                                                       |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Enhanced Reduction of Carbon-Iron Ore Composite Briquettes under Varying Pressing Forces via Direct Microwave Heating</b><br>Q.D. Ngo, M.T. Nguyen and H.V. Nguyen | 227 |
| <b>Reduction of Iron Ore Pellets Containing Blast Furnace Dust</b><br>T.T.T. Hien and N.S. Long                                                                       | 235 |
| <b>Reduction of the Residue from the Leaching Process of Electric Arc Furnace Dust</b><br>C.S. Nguyen, Q.D. Luu, H. Le and A.H. Bui                                   | 241 |
| <b>Crystallization of Rice Husk Produced Silica and Silicon Carbide</b><br>T.T.T. Hien and N.S. Long                                                                  | 248 |
| <b>Optimization of Ingredients in Polystyrene Waste-Based Adhesive for Wood-to-Wood Bonding Using Experimental Planning</b><br>H.N. Cong, H. Nguyen and V.A. Doan     | 254 |