

# Table of Contents

## Preface

## Chapter 1: Materials for Opto- and Microelectronics

|                                                                                                                                                                                                      |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Enhanced Electrical Conductivity of Graphene-Incorporated Copper Wire and its Performances on Coaxial Cable Application at Sub 6 GHz</b><br>Y.C. Jin, H.C. Pan and S.H. Chen                      | 3  |
| <b>1-xSr<sub>x</sub>MnO<sub>3</sub> Thin Films on a-SiO<sub>2</sub> Substrates Produced by Metal Organic Decomposition Method</b><br>S. Kawaguchi, K. Hamada, H. Kobori, T. Taniguchi and T. Shimizu | 9  |
| <b>Experiments of Failure and Damage in ITO-Coated PC/FPC with ACF Bonding due to Bending Fatigue</b><br>C. Lin and C. Chu                                                                           | 15 |
| <b>Fabrication of Liquid-Metal Printed 2D Tin Oxide Nanosheets for Optoelectronic Applications</b><br>S. Fujii                                                                                       | 21 |

## Chapter 2: Materials for Sensor Devices

|                                                                                                                                                                                                                   |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Design of Electrical Sheet Resistance of Thin Film Measurement System Based on GM Cryocooler in Cryogenic Temperature</b><br>Z. Geng, Y.M. Han, Z.R. Zhou, H.Y. Qi, Y.C. Zhao, H.J. Su, R.J. Huang and L.F. Li | 29 |
| <b>Experimental Characterisation of BGBC OTFT for Indoor CO<sub>2</sub> Gas Sensing</b><br>M.N. Zailan, K. Ismail, M. Syaripuddin and M.S. Mohd Sabri                                                             | 35 |
| <b>Enhanced Performance of Epoxidized Natural Rubber Nanocomposites for Strain Sensor Application</b><br>S. Trimongkonkool, K. Boonkerd and A. Krainoi                                                            | 45 |
| <b>Flexible and Disposable Gas Sensors Based on Two-Dimensional Materials</b><br>F. Ma'ashi, A. Aljarb and H. Al-Jawhari                                                                                          | 51 |

## Chapter 3: Preparation and Properties of Nanomaterials

|                                                                                                                                                                                                                                         |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Preparation of Silver Nanoparticles Deposited on TEMPO-Oxidized Cellulose Nanofibers</b><br>P. Phaonong, S. Tanpichai and A. Boonmahitthisud                                                                                         | 61 |
| <b>Characterization and Self-Cleaning Properties of Silk Fabric Coated by Chitosan-Xyloglucan/nano-TiO<sub>2</sub> Composite Film</b><br>C. Na Lampang, P. Sriprom, K. Manamoongmongkol, P. Assawasaengrat, W. Narkrugsa and L. Phumjan | 67 |
| <b>Investigation of Polylactic Acid Nanofibers as Enhanced Plant Growth Medium by Improved Melt-Blowing Method</b><br>S.P. Tsai, W. Wu, H. Sota, T. Hirogaki and E. Aoyama                                                              | 73 |
| <b>Chitosan-Based Coating Incorporated with Chitin Nanofibers for Extension of the Shelf Life of Fruits</b><br>P. Kaeokanphai, S. Tanpichai and A. Boonmahitthisud                                                                      | 79 |

## Chapter 4: Preparation and Properties of Polymer and Composite Materials

|                                                                                                                                                              |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Analysis of the Curing Behavior of Cyanate/Epoxy Resins for Fusion Magnets</b><br>B. Baoleer, Y. Xiang, L. Shi, W.T. Sun, Z.X. Wu, R.J. Huang and L.F. Li | 87 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----|

|                                                                                                                                                                                                          |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Rheological and Thermal Characterization of Glycerol Monostearate (GMS) as Compatibilizer on Polyethylene-Palm Stearin Composite</b><br>I. Subuki, N.A. Ramlee, A.R.M. Daud, M.H. Ismail and N. Rasid | 93  |
| <b>Glass Transition Temperature and Mechanical Properties of Poly(Ethylene Carbonate)/Organoclay Composites</b><br>N.A. Ramlee, N.S.A. Ibrahim, B.J. Victor and N.Z.K. Shaari                            | 101 |
| <b>Effect of Rubber Formula on Performance of Natural Rubber Based Foam for Insulating Ceiling Board Application</b><br>N. Jantawong, K. Boonkerd and K. Hancharoen                                      | 107 |

## **Chapter 5: Technologies of Chemical Production**

|                                                                                                                                                                               |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Using Borax as a Cross-Linking Agent in Poly(Vinyl Alcohol)/Hemp-Extracted Cellulose Hydrogels</b><br>P. Silprasert, A. Boonmahitthisud and S. Tanpichai                   | 115 |
| <b>Physical and Chemical Characterization of Lignin-Based Carbon as Acidic Catalyst</b><br>A.H. Hassan, M.M. Zainol, S.N. Ismail, M. Asmadi, K.R. Zainuddin and N. Abd Rahman | 121 |

## **Chapter 6: Biomedical Materials and Nanomedicine**

|                                                                                                                                                                                                              |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>The Physical Properties of Vanillin-Incorporated Irreversible Hydrocolloid Impression Material</b><br>S. Leelapong, S. Mateekusontan, S. Makkrajang, P. Churnjittapirom and S. Thaweboon                  | 129 |
| <b>Antimicrobial Effect of Dental Adhesive on Cariogenic Multi-Species Biofilm</b><br>S. Thaweboon, T. Saito, S. Mateekusontan and B. Thaweboon                                                              | 135 |
| <b>Tailoring Structure-Dominated Mechanical Properties of Poly(L-Lactide Acid) Monofilaments via Controllable Molecular Relaxation</b><br>J.B. Liu, C. Zhang, X. Hu, J. Cheng, Z.H. Ni and G.T. Zhao         | 141 |
| <b>Mechanical Behavior of Polymer Braided Stent at Rapid Radial Loading</b><br>X. Hu, C. Zhang, B. Wang, J.B. Liu, J. Cheng, G.T. Zhao, Z.H. Ni and J.K. Yang                                                | 147 |
| <b>Isolation of Cellulose Nanosphere from Corn Husk as a Filler for UV-Cured PEGDMA Nanocomposite Hydrogels</b><br>R.C. Tilwani, K.N.A.K. Calimon and P.A.N. de Yro                                          | 153 |
| <b>Optimisation Studies of Mesoporous Silica Nanoparticle as a Drug Carrier for Gemcitabine: Enhancing Therapeutic Effectiveness in Pancreatic Cancer</b><br>S.L. Chung, W.M. Lim, C.O. Leong and M.S.L. Yee | 161 |
| <b>Revolutionizing Antibacterial Surfaces: 3D Printed Nanoscale and Microscale Topographies through Two-Photon Polymerization</b><br>N. Tan, J. Im, N. Neate, R.D. Wildman, G.E. Marsh and M.S.L. Yee        | 169 |
| <b>Silver and Palladium-Embedded Acrylamide-Based Hybrid Cryogels as Antimicrobial Agents</b><br>Q. Ullah, N. Kizilbash, J. Ambreen, A. Haleem, M. Soliman, M.A. Alotaibi and M. Siddiq                      | 179 |

## **Chapter 7: Materials Forming and Additive Manufacturing**

|                                                                                                                                                                                |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Sheet Forming of Roll Cast Aluminum Alloy for Die Casting</b><br>T. Haga, S. Mori, H. Ochi, H. Fuse, H. Watari and S. Nishida                                               | 189 |
| <b>Mechanical Behavior and Void Analysis of 3D Printed PEEK by Fused Deposition Modeling (FDM) with Varying Infill Patterns</b><br>S.L. Abing, P.A.N. de Yro and S.A.C. Aranez | 195 |
| <b>Printability and Mechanical Properties of PLA/Iron Composites for FDM 3D Printing</b><br>K. Doungkeaw and J. Tungtrongpairoj                                                | 201 |

## **Chapter 8: Protective Coatings**

|                                                                                                                                                                                                                     |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Effect of Current Density on Hardness of Ni-P/Diamond Composite Coatings Fabricated by Electrodeposition</b><br>N. Kothanam, C. Hom-on, J. Srimaneerat, P. Wintachai, P. Moolla, K. Harachai and P. Jaroenapibal | 209 |
| <b>Influence of Duty Cycle on the Phosphorus Content and Hardness of the Ni-P Coatings Produced by Pulse-Current Electroplating</b><br>P. Wintachai, N. Kothanam, K. Harachai, N. Triroj and P. Jaroenapibal        | 215 |

## **Chapter 9: Materials for Thermal Engineering Application**

|                                                                                                                                                                      |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Improving the Thermo-Physical Properties of Plam Oil with Zeolite Nanoparticles</b><br>P. Assawasaengrat, T. Limsakul, P. Bunprasert, W. Chokelarb and P. Sriprom | 223 |
| <b>Halloysite Nanotube (HNT) Dispersion Stability in 10% Ethanol-Water Mixture and Water</b><br>A.Z.F. Dilidili, J.B. Habiling, P.E.C. Maglalang and J.C. Millare    | 229 |