

Table of Contents

Preface, Committee

Chapter 1: Biocomposites and Materials for Biomedical Application

Preparation, Characterization and Photostability Study of Biocomposites Comprising Quantum Dots for Bioimaging Application	
N. Abu, N. Ismail, Z. Ahmad Zubir and N.M.A. Nik Abdul Aziz	3
Biodegradable Mg Strengthened Poly-Lactic Acid Composite through Interfacial Properties	
M.S. Butt, J. Bai and F. Xue	7
Kenaf Silicone Biocomposites: Synthesis and its Hyperelastic Behaviour	
N.N. Azmi, A.K. Hussain and J. Mahmud	12
Fabrication and Microstructure Evaluation of Fibrous Composite for Acetabular Labrum Implant	
A. Anindyajati, P. Boughton and A.J. Ruys	17
Biocomposites Formulated with Virgin/Recycled Acrylonitrile Butadiene Styrene	
S. Nikmatin, A. Syafiuddin, Irmansyah and D.A.Y. Irwanto	23
Synthesis of Multi-Walled Carbon Nanotube-Zirconia Composite and Bovine Serum Albumin Adsorption Characteristics	
K. Bozgeyik and T. Kopac	27

Chapter 2: Materials and Technologies of Chemical Production

Preparation of Polymer Nanoparticles and Application on Nitrile-Butadiene Rubber Reinforcement	
C.C. Wang, C.L. Chiu and J.S. Shen	35
Synthesis and Pore Structure Characterisation of Novel Mesoporous MgO-CeO₂/SBA-15 as a Potential Catalyst Support	
J.K. Efavi, A. Yaya, E. Bowen-Dodoo, L.A. Dampitey and R.Y. Abrokwah	40
Synthesis of Hybrid Carbon Nanoparticles Using Multi-Walled Carbon Nanotubes and Fullerene via Self-Assembly	
P.S. Karthik, Z. Lin, V.A. Korada, M. Hada, T. Nishikawa and Y. Hayashi	46
Preliminary Study on the Manufacturing Process of a Membrane Filtration for Protein Concentration from the Recycled Materials	
T.W. Chung, S.H. Hsu, C.K. Chen, Y.F. Lin and Y.S. Lin	50
Surface and Interface Engineering of Tungsten Oxide for Highly-Efficient Catalysis	
J.J. Song, Z.F. Huang and J.J. Zou	54

Chapter 3: Materials and Technologies for Energy Storage, Opto- and Microelectronics

Engineering the Electronic and Magnetic Properties of Sc₂CF₂ MXene Material through Vacancy Doping and Lattice Straining	
L. Ao, A. Pham, X.T. Zu and S. Li	61
Nonlinear Refraction and Absorption Properties of ZnS Semiconductor Quantum Dots	
H.Y. Tan, Q. Chang and X.W. Liu	65
Optoelectronic Analysis of CdGa₂X₄ (X= S, Se): A Promising Material for Solar Cells	
P. Kumar, J. Sahariya, A. Soni and K.C. Bhamu	69
Synthesis of LiFePO₄/C Composites Cathode via Solid-Phase Method	
L.N. Sun, Z.Y. Yuan, Y.F. Xue, W.L. Hong, X.Z. Ren and P.X. Zhang	74
The Study of Ion Beam Assisted Deposition of CuInSe₂ Absorber Films	
X.L. Li, Y.D. Feng and H. Wang	78
Effect of Nitrogen Flux on the Properties of N-Doped Zn_{1-x}Mg_xO Thin Films	
W. Liu, C.L. Liu, H.X. Chen and R. Wang	83

Gold Nanoparticles Resistance Induced by Femtosecond Pulse Laser C.Y. Zhang, J. Hai, Z.L. Liu and Z.Y. Liu	89
Electrochemical Redox Reactions of Lithium Ion on Nickel Electrode in Propylene Carbonate-Based Solutions M.H. Jo, Y.H. Lee and S.K. Jeong	93

Chapter 4: Functional Ceramics and Ceramic Matrix Composites

Obtaining of Graphene Structure Containing Ceramic Composites in High Temperature Vacuum Furnace N. Jalagonia, F. Marqui, K. Barbakadze, E. Sanaia, G. Bokuchava and T. Kuchukhidze	101
Improvement of Mechanical Properties of CNT/Epoxy Nano Composites Using the B4C by Taguchi Method M. Taşyürek and C. Nazik	105
Machinability Analysis in Drilling Glass/Epoxy Composites with Filled MWCNTS I. Ovali and A. Mavi	110
Oxidation Kinetics of ZrB₂ Ceramic Matrix Composite Materials H. Yu, Q. Huang, W. Wang, L.T. Liu, C.W. Li, M.H. Xu, X.Q. Wang, J.G. Song, S.B. Li and L. Chen	116
Optimization Process during Laser Machining of 2 mm Thick Al/Al₂O₃ MMC A. Ghosal, A. Manna and P. Patil	121
Performance of Electrical Discharge Milling and Sinking in Micro Graphite Powder Mixed Dielectric H. Marashi, A.A.D. Sarhan, I. Maher and M. Hamdi	127

Chapter 5: Functional Coatings and Films

Investigation on Fracture Toughness of Coating/Substrate Interface - Case Study: Thermally Sprayed Nickel Based Superalloy on Variety of Substrates S. Abualigaledari, M. Salimi Jazi and F. Azarmi	133
Formation of Nanosized Coatings in Hybrid Plasma Reactor Combining Magnetron or Arc Deposition with RF Plasma Assistance E.A. Kralkina, P.A. Nekludova, A.M. Nikonov, A.A. Airapetov, V.A. Sologub and N.A. Dyuzhev	137
Aluminide Coating Application for Protection of Anodic Current-Supplying Pins in Soderberg Electrolytic Cell for Aluminium Production V. Kovrov, Y. Zaikov, V. Tsvetov, Y. Shtefanyuk, V. Pingin and M. Golubev	141
Photoluminescence Properties of Ru(bpy)₃²⁺ in TEMPO-Oxidized Cellulose Nanofiber Films L.Y. Song, K. Takahashi, T. Higuchi and T. Aita	146