

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Nanoscience

A Control System Design for Nanoparticle Manufacturing by Using Im-Pinging-Jet Micromixers Y. Wu, J.G. Lu and Q.M. Yang	3
Development of Anodic Titanium Oxide Nanotubes Applied to a pH Sensor with Amperometric and Potentiometric Methods H.C. Lee, L.F. Zhang, C.H. Lu, J.L. Lin, Y.L. Chin and T.P. Sun	10
Compressive Mechanical Properties of Carbon Nanotube Sponges: Experiments and Modeling P.Z. Sun and H.W. Zhu	14
Design and Fabrication of Micropump Actuated by Laser Shock Wave J.C. Xia, L.C. Xiong, P. Chen and Y. Wu	18
Design and Fabrication of Thermocapillary Micro Bubble Pump T.S. Leu and Y.H. Liu	23
Development of Nano-TiO₂ Coating on Titanium Alloy Substrate for Biomedical Applications H. Liu and L.Q. Guo	27
Preparation and Characterization of Attapulgite-KH550 Nanocomposites and their Application to Methane Absorption F. Liu, T. Hu, S.Y. Ren and Y.Y. Shi	31
Preparation and Characterization of Cellulose Nanowhiskers in <i>N, N</i>-Dimethylacetamide P. Qu, X. Wang and L.P. Zhang	35
Preparation and Characterization of Chitosan-Poly(MA-PEG₄₀₀-SA) Nanoparticles as Drug Carrier D. Zhang, F. Qiu and Y. Diao	39
Preparation and Hydrogen Storage Kinetics of Nanocrystalline and Amorphous Mg₂₀Ni_{10-x}M_x (M=Co, Cu; x=0-4) Alloys Y.H. Zhang, Z.H. Hou, G.F. Zhang, H.W. Shang, F. Hu and D.L. Zhao	43
Preparation and Properties of Gd and Sb Doped SnO₂ Conductive Nanoparticles X.Z. Liu, J. Chen, L.L. Song and N. Ni	50
Preparation of Cortex Moutan Nanoparticles and its Microscopic Characteristics and Physicochemical Properties Y.J. Cui, W.G. Wang, P. Li, Y.L. Zhao, Y.N. Gu, T.T. Meng, J.J. Ding, P. Zhang and K. Jia	54
Preparation of Liuweidihuang Nano-Microcapsules and its Physicochemical Properties Y.J. Cui, W.G. Wang, P. Li, Y.L. Zhao, Y.N. Gu, T.T. Meng, J.J. Ding, P. Zhang and K. Jia	58
Process for Manufacturing Multi-Functional Nano-TiO₂ Composite Powder B. Wang, Z.Y. Luo, W. Huang, L. Li, W.X. Huang and J.Q. Du	64
Removing of Nano-Particles from Semiconductor Wastewater Using a Hybrid Treatment System B.M. Yang, C.M. Kao, W.P. Sung, C.P. Yang and T.Y. Chen	71
Resonance Suppression on Nanoscale Viscoelasticity Measurement P. Xie, L. Zhang and Q.Z. Zou	75
Cellular Uptake of PEGylated PLGA Nanoparticles in Hela Cells G. Li, D.H. Lin, X.X. Xie, L.F. Qin and J.T. Wang	80
A Fabrication Study on Diode FED Panel Utilizing Improved Film-Electrode F.G. Wang, T.T. Wang and Y.K. Li	84

Chapter 2: Materials Engineering

A Computational Study on Structures, Stabilities and Electronic Properties of Trifluoromethyl Silsesquioxanes $\text{Si}_{2n}\text{O}_{3n}(\text{CF}_3)_{2n}$ (n=1-5)	91
S.Y. Yu, C.G. Zhang and Y.L. Wang	
AFM Interaction Forces of Lubricity Materials Surface	95
X.F. Li, C. Wu, S.X. Peng and J. Li	
Adsorption Kinetics of Pb (II) onto Na-Bentonite/Poly AMPS Composite	99
H.Y. Xiao, K.S. Gao and Q.R. Li	
Capsaicin Injectable <i>In-Situ</i> Forming Gels	103
T. Phaechemud and S. Tuntarawongsa	
Calcium Ion Treatment Behavior of Silk Fibroin/Sodium Alginate Scaffolds	107
J.F. Ming, B.Q. Zuo and Y.X. Jiang	
Characteristics of Compression Wood Tracheid of Loblolly Pine Induced by Artificial Inclination	113
Y.M. Liu, S.Q. Liu, L. Zhou and L.C. Qian	
Controlled Synthesis and Upconversion Luminescence Properties of Yb^{3+}-Tm^{3+} Codoped NaYF_4 Hexagonal Submicroplates	117
W.J. Huang, C.H. Lu, Y. Song, H.M. Huang, Y.Q. Wang, Y.R. Ni and Z.Z. Xu	
Dielectric Properties of Zr-Doped CCTO Based Ceramics Prepared via Sol-Gel Method	121
C.Q. Ye and L. Ding	
Li⁺ Extraction/Insertion Reaction with $\text{LiMnTi}_{0.25}\text{O}_3$ Spinel	126
J.H. Jiang	
Effect of Rare Earth on the Inclusions and Pitting Resistance of Duplex Stainless Steel	130
X. Liu and L.M. Wang	
Effect of Temperatures on Tensile of Aluminium Thin Films	135
Q.N. Guo, S.E. Yang, Q. Sun, Y. Jia and Y.P. Huo	
Film Properties of Poly(lactic Acid) Comprising N-Methyl-2-Pyrrolidone	140
S. Chitrattha and T. Phaechemud	
Friction Welding of $\text{Zr}_{41}\text{Ti}_{14}\text{Cu}_{12.5}\text{Ni}_{10}\text{Be}_{22.5}$ Bulk Metallic Glass and Temperature Field Simulation	144
B. Chen, T.L. Shi, G.L. Liao and Z.J. Zhu	
Investigation of Precipitation in a Aging Hardened Plastic Mould Steel	152
Y. Luo and X.C. Wu	
Investigation on the Infrared Absorption Spectrum of Pearl and Nacre	156
C.Y. Huang, Q.X. Chen, Z.Y. Xiong, Y.J. Feng, Y.Q. Li and H. Wang	
Effect of Hydrolysis on High-Purity TiO_2 Size for PTC Thermistor	160
Z.Q. Luo and J.Q. Du	
Modification of NCC for Improving the Wetting Property with Polyurethane	164
H. Zhang, S.P. Song, Y. She, Q. Lang and J.W. Pu	
Photosensitization of Colloidal ZnO Semiconductor System with Hypocrellin A	168
X.L. Chen, Z.Y. Zhang, J.C. Zhang, W. Liu, N. Wu, S.P. Feng, W.C. Chen and L.S. Yang	
Plain Carbon Strip Q235 Grain Growth in Reheating Progress	172
C.L. Mo, S.P. Du, X.M. Guo and L.S. Cui	
Polymer-Assisted Hydrothermal Synthesis of PbTiO_3 Crystals	176
Y.G. Wang, L.L. Yang, X. Wang, S. Li, Y.J. Wang and X.F. Wang	
Polymeric Eutectic System	180
S. Tuntarawongsa and T. Phaechemud	
Preparation and Characterization of PMAA/SiO_2 Composite Particle Via Emulsion Polymerization	184
K.H. Zhang, J.J. Du, H. Xiao and Y. Yuan	
Preparation and Characterization of the PMIA Fibrous Membrane	188
R.B. Wang, M.J. Yu, F. Yang, J. Guo and R.D. Yang	
Preparation and Influencing Factors of ZnO Whisker by Hydrothermal Microemulsion Process	193
X.D. Ai, L.T. Yan, Y.C. Liu, T.X. Li, S.Y. Dou and C.A. Dai	
Preparation and Thermal Properties Characterization of Cholesterol-Modified Amphiphilic Chitosan	197
F.H. Li, W.J. Zhang, S.X. Li, Y. Sun and T. Jiang	

Secondary Use of PHEV and EV Lithium-Ion Batteries in Stationary Applications as Energy Storage System	202
G.J. Zhao, W.L. Wu, W.B. Qiu, S.L. Liu and G. Wang	
Synthesis, Structure and Photoluminescence of a Potential Luminescent Material of Mn(II) Coordination Polymer	206
X.L. Zhang, K. Cheng and Y.L. Song	
The Effects of Nanocrystalline Cellulose on Polysulfone Hollow-Fiber Ultrafiltration Membrane	210
X. Wang, H.L. Bai and L.P. Zhang	
The Effects of Selenization Temperature on the Properties of CIGS Thin Film Prepared by Cu-In-Ga-Se Precursors	214
H.B. Wang, X.J. Zhang, Q.P. Wang, X.Y. Zhang and X.Y. Liu	
The Microstructure of Joint Brazed by Semisolid Stirring Brazing at High Welding Speed	219
H.B. Xu, Y.L. Zeng, B. Dou, C.J. Zhang and X.Y. Ding	
The Processing Parameters of Polyacrlonitrile Electrospinning Filament Assembly with Parallel Alignment	223
K. Lai, C.K. Liu, M.Y. Chen and R.J. Sun	
Theoretical Analysis of Chemisorption-Induced Surface Stress	229
J.Q. Zhang, X.Q. Feng, G.Y. Huang and S.W. Yu	
Chitosan-Aluminum Monostearate Composite Dispersion Characteristics	233
K. Yodkhum and T. Phaechamud	
Monte Carlo Simulation of Alpha (α) Particles Penetration in Nanoscale Silicon Semiconductor Materials	237
H.F.A. Amir and F.P. Chee	
Differences of Nano-Structure between Waxy and Normal Starch	241
P. Liu, C.Q. Gu, Q.Z. Zeng and H.H. Liu	
Effect of TiO₂ Compact Layer on Optical Absorption and Fluorescence Performance of R6G/PMMA Composite Light - Guided Films	245
P. Mukdachacharoenchai, W. Mekprasart, J. Sritharathikhun and W. Pecharapa	
Enhanced Electrochromic Performance of Sol-Gel Derived WO₃ Thin Films Assisted by Electrospun PVA Nanofibers	249
K. Paipitak, J. Rattanarak, D. Pakdeeyingyong, W. Techitdheera, S. Porntheeraphat and W. Pecharapa	
Numerical and Experimental Study on Fabrication of Microstructure Array with Topographical Gradient via Through-Mask EMM	254
Q.D. Wang, J.M. Xiao and Y.J. Lü	
Photocatalytic Degradation of Sulfonamides over the Short Multi-Walled Carbon Nanotube-TiO₂ Hybrid	259
K. Dai, H.B. Chen, C.W. Liu, H. Chen and Q.Y. Huang	
Study on Surface Modification of Nano-Alumina with Silicane Coupling Agent KH550	263
F.R. Shan, Z.M. Yu, M.Q. Wang and Y. Zhang	
Synthesis and Properties of ZSM-5/MCM-41 Composite Zeolite with a Core-Shell Structure for Cracking of Supercritical <i>n</i>-dodecane	267
J.D. Na, G.Z. Liu, M.L. Ji, X.S. Ma, S.L. Hu and L. Wang	
The Light Absorption Properties of Cu₂S Nanowire Arrays	272
S. Ren, L.Q. Li, Z.F. Liu, M. Li and L. Hong	
The Stability Study of Nifedipine-Loaded Microemulsions	277
H.J. Zhou, F. Tian, Q. Xia, L. Chen, W.H. Li and X.C. Ding	
Timoshenko Beam Model for Buckling of Nanowires with High-Order Surface Stresses Effects	281
M.S. Chiu and T.Y. Chen	