

# Table of Contents

## Preface and Organizing Committee

## Chapter 1: Advanced Nano-Technology and Application

<b>Effect of Nano-Al<sub>2</sub>O<sub>3</sub> on the Microstructure and Properties of ZrO<sub>2</sub> Dental Materials Prepared by Microwave Sintering</b> Y.L. Ai, X.H. Xie, W. He, B.L. Liang and W.H. Chen	3
<b>Solid-State Nanopores for Nanoparticle Sensing</b> L. Wang, W.Y. Zhao, D. Mo and Q.J. Liu	8
<b>Preparation and Photocatalytic Activity of Silver Doped TiO<sub>2</sub> Nanotubes</b> Y.C. Xu and H. You	14
<b>Study on Photoelectric Properties of Dye-Sensitized Solar Cells Based on Thixotropy Electrolyte</b> L.G. Jin, S. Wang and H.J. Wang	19
<b>Preparation and Characterization of Magnetite Nanoparticles</b> F.Y. Zhao, Y.L. Li and L.H. Li	24
<b>Visible Photoluminescence of Gas Phase Synthesized Well-Defined Germanium Oxide Nanoparticles</b> S. Xu, Y.L. Nan and L. Sun	28
<b>Influence of Sulfur Sources on the Phase Structure of CZTS Nanocrystals</b> P. An, X.Q. Xu, Z.R. Liang and G. Xu	33
<b>Structural Dependences of Gunn Oscillations in a Planar Nano-Device</b> K.Y. Xu, Y.N. Wang and Z.N. Wang	39
<b>Study on Microstructure of Nano-Zirconia Coating by Atmospheric Plasma Spraying</b> Y. Chang, Q.B. Zhu, S.J. Dong, H.H. Wang and K.H. Du	43
<b>Influence of Different Ultrasonic Wave on Polymerization of Polyaniline Nanofiber</b> M.R. Husin, A. Arsad, A. Hassan and O. Hassan	50
<b>Predicting Nanofiltration Performance during Treatment of Welding Electrode Manufacturing Wastewater, Using Artificial Neural Networks</b> H.A. Golestani	55
<b>Applying Information Theory's Methods to Physics' Content for Students in Nanoelectronics</b> T.N. Gnitetskaya, E.B. Ivanova and K.V. Nefedev	60
<b>Galvanic-Cell-Based Synthesis and Photovoltaic Performance of ZnO-CdS Core-Shell Nanorod Arrays for Quantum Dots Sensitized Solar Cells</b> L.H. Chi, P.D. Long, H.V. Chung, D.T. Phuong, D.X. Mai, N.T.T. Oanh, T.T.D. Lien and L.V. Trung	64

## Chapter 2: Materials, Materials Processing and Chemical Engineering

<b>Research for Photoelectric Property of SnO<sub>2</sub> Doped Sb</b> X. You, F. Miao, Y. Huang and C.W. Zhang	71
<b>Preparation and Photocatalytic Performance of TiO<sub>2</sub>/Modified Expandable Graphite Composite Material</b> H.L. Wang, Q. Deng, H. Liu, Y.Z. Zhou and Y.Z. Zhang	76
<b>Modification of Expandable Graphite and Adsorption for Methyl Orange</b> L. Yang, H. Liu, Q. Deng, Y.Z. Zhou and Y.Z. Zhang	81
<b>Bonding Properties of Poplar Plywood with High Moisture Content Veneer</b> J.Z. Qiao	86
<b>Core of the Structural Characteristic of Natural Zeolite and its Catalytic Activity in the Aromatization of Light-Molecular Paraffin</b> V. Gulzira, M. Raisa, K. Zhaksyntay and Y. Elmira	90

<b>Electrospinning Preparation and Properties of Tb(phen)L<sub>3</sub>/PMMA Rare Earth Luminescent Fibers</b>	
F.L. Zhao, L. Gao, C.H. Wang and P. Xi	94
<b>Elastic Constants and Thermodynamic Properties of B2-DyCu Intermetallics</b>	
Y.R. Wu and L.S. Xu	100
<b>Preparation and Coating Properties of Silicone/Cuprous Modified Acrylic Resin</b>	
Z.G. Liu, Y.N. Guo and D.Y. Mao	105
<b>Salt Spray Corrosion Performance Associated with the Glass Forming Ability of the FeCo-Based Bulk Metallic Glasses</b>	
W. Jiang, Q.J. Chen, J. Shen, F.B. Zhang, X.L. Zhou and X.Z. Hua	109
<b>Research on the Effects of Admixture on Concrete Permeability</b>	
K.Q. Xia, W. Guo, X.W. Liu, H. Liu, Z.G. Li and Y. Li	114
<b>High-Temperature Low-Cycle Fatigue Behavior of 625 Nickel-Base Superalloy Welding Joint</b>	
Y.Y. Wang, B.S. Wang and L.J. Chen	120
<b>Synthesis of Epoxy-Functionalized Micro-Zone Plates by UV-Initiated Copolymerization</b>	
L. Li and H.Y. Wang	125
<b>Preparation of a New Oil Absorbing Polyurethane Foam</b>	
M.Y. Guo, H.W. Wang, Y.H. Wang, Q.Y. Si, Z.Z. Guo, X.F. Wei and H.H. Song	131
<b>Thermal Catalytic Recycling of Plastic Wastes</b>	
A. Ermek, T. Zheneta, K. Zhaksuntay and B. Kairat	136
<b>A Review on Development and Properties of GLARE, an Advanced Aircraft Material</b>	
Y. Liu, R. Zhang, E.Q. Liang, D. Li, Y. Chen and J. Zhang	140
<b>Fabrication of Periodic Microstructures on Nickel Template by Multi-Beam Laser Interference</b>	
L. Zhang, R.Y. Xiang, X.W. Cao, S.G. Li and H.C. Sun	146
<b>Diffusion Bonding between AZ31 Magnesium Alloy and 7075 Aluminum Alloy</b>	
Z.T. Chen, F. Lin, J. Li, F. Wang and Q.S. Meng	150
<b>Preparation of Oil Absorption Bubbles Using a New Surface Treatment Technology</b>	
Q.Y. Si, H.W. Wang, X. Cui, M.Y. Guo, N.N. Zheng, X.F. Wei and H.H. Song	154
<b>Analysis of Slip Induced One Dimensional MHD Flow between Parallel Plates</b>	
K. Ahmad, X.Z. Zhao, D.Y. Li, D.L. Jing and Y.L. Pan	159
<b>Degradation of Azo Dye Wastewater by UV/TiO<sub>2</sub> Combined with an Ultrasonic Procedure</b>	
Y.H. Hsieh, C.Y. Chang, M.W. Chen and M.K. Shen	164
<b>Synthesis and Characterization of a New Coumarin-1,2,3-Triazole Diad</b>	
H.Q. Li, X.J. Tian, Z. Chen, D. Xiao, N. Fang, Y.X. Lv and L. Gu	170
<b>Preparation of 3DON Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> and Behavior of Li<sup>+</sup> Ion Exchange</b>	
D.Q. Dong, W.X. Wang and M.L. Wang	175
<b>Synthesis and Properties of Environmentally Friendly Scale and Corrosion Inhibitor</b>	
Z.F. Liu, X. Bai, L.H. Zhang and Y.L. Zhang	180
<b>Synthesis of Aqueous Non-Isocyanate Polyurethane</b>	
W.Y. Zhang and B.H. Zhang	184
<b>The New Catalysts of Liquid-Phase Arenes Oxidation</b>	
T. Zheneta, S. Valeriya, A. Nazym and A. Ermek	189
<b>Structure Studies on Order Assemblage of Manganese<sup>II</sup> Isovanillin Complexes</b>	
Y. Liu, S.S. Zhang, D.J. Song, T.Z. Yang, H.X. Tian and J. Gao	193
<b>Preparation and Photocatalytic Activity of Gold Nanoparticles (AuNPs)/ZnFe<sub>2</sub>O<sub>4</sub></b>	
S.Y. Qi, M. Chen, X.H. Liu and H.Y. Xu	198
<b><i>In Situ</i> Reducing Synthesis of (CTAB+C<sub>18</sub>NH<sub>2</sub>)-Modified Hydrophobic Gold Nanoparticles at Room Temperature</b>	
L.P. Chen	203
<b>UV-Fenton Discoloration of Methyl Orange Using Fe<sub>3</sub>O<sub>4</sub>/MWCNTs as Heterogeneous Catalyst Obtained by an <i>In Situ</i> Strategy</b>	
T.N. Shi, H.Y. Xu and H.Z. Chang	208
<b>Pyrolytic Synthesis of Bifunctional g-C<sub>3</sub>N<sub>4</sub> Derived from Melamine</b>	
L.C. Wu, H.Y. Xu and H. Zhao	215
<b>The Thermal Stability of Ce<sub>0.67</sub>Tb<sub>0.33</sub>MgAl<sub>11</sub>O<sub>19</sub> by SiO<sub>2</sub>-Coating in Sol-Gel Processing</b>	
L. He, R. Ling, W.M. Sun, W.S. Li and Q.Z. Dong	220

<b>Characterization of Metallo-porphine Monolayer and Bilayer on Ag(111): Screening of Substrate Effects</b>	
Y. Du, X.Q. Tian and J.B. Xu	225
<b>Effect of Ball Grinding Time on the Particle Sizes of Tourmaline to the Release Ability of Negative Ions</b>	
Y.L. Zhang, G. Gao, X.L. Gou, J.H. Xu, W.J. Liu, B. Liu and H.G. Wang	233
<b>Polymetallic Catalysts for the Process of Hydrogenation of Nitrocompounds</b>	
Y. Elmira, K. Zhaksyntay, A. Kali and V. Gulzira	238
<b>Preparation of Liquid Fuels from Chark Chemical Tar</b>	
S. Nazym, K. Zhaksyntay and Y. Akzhan	243
<b>Effect of Cerium Concentration on the Corrosion Resistance of Electro-Less Ni-P-PTFE Composite Coatings</b>	
C.Q. Fu, F. Yong and Q.L. Zhang	247
<b>Improvement of Complete Circulation of Aqueous Solution for Urea Production Processing with Premixing</b>	
X.D. Liu, Y.L. Zhu and X.Y. Gu	252

### Chapter 3: Biological and Medical Engineering and Technology

<b>Cloning and Analysis of Vacuolar Invertase Gene (MeVINV2) Promoter from Cassava (Manihot Esculenta Crantz)</b>	
J. Liu, Y.P. Hu, W.R. Xia, Y. Yao, Y. Zhou, S.P. Fu, R.J. Duan, R.M. Li and J.C. Guo	259
<b>Visual Detection of <i>Mycobacterium tuberculosis</i> Complex with Loop-Mediated Isothermal Amplification and Eriochrome Black T</b>	
D.G. Wang	264
<b>Arbuscular Mycorrhizal Fungi (AMF) on Growth and Nutrient Uptake of Beach Plum (<i>Prunus maritima</i>) under Salt Stress</b>	
X.M. Zai, Z.P. Hao, H. Wang, Y.F. Ji and Y.P. Li	268
<b>Glial Cells Missing Gene Upregulated by Ecdysone in <i>Drosophila</i></b>	
G. Wang, L.L. Yang and H.Y. Liu	273
<b>A-MBED: Adaptive Markov Blanket Method for Epitasis Detection in Genome-Wide Association Studies</b>	
T. Peng, H. Wang, Y.R. Wang, W.W. Xie and J.W. Luo	278
<b>Research on Immobilized Ammonia-Oxidizing Bacteria by Sodium Alginate</b>	
Y.W. Dong, J.Z. Miao and A.H. Chen	283
<b>Development and Application of a Novel Nucleic Amplification Kit on Rapid Detection of Various Types of Staphylococci Strains</b>	
Y. Deng, Y.R. Liang, L. Li, B. Li and J.Y. Su	288
<b>Development and Application of a Novel Nucleic Amplification Kit on Detection of Several Pathogens</b>	
Y. Deng, L.L. Ji, L. Li, B. Li and J.Y. Su	293
<b>Isolation and Identification of Antioxidant Peptides from Black Soybean Protein</b>	
Z.H. Geng, E.Q. Liu, J.P. Zhang, S.L. Chen, Y. Li and Y.H. Wu	298
<b>Optimization of Mixed Fermentation Conditions by Mixed Culture of Kefir and <i>Bacillus</i></b>	
T.H. Zhang, X.Y. Zhang, M. Tian, S.N. Zhong and Z.Y. Du	303
<b>Aroma Analysis of a New Oolong Tea of Golden Guanyin by Gas Chromatography/Mass Spectrometry</b>	
C.G. Cai, J.W. Mao, X.L. Xu, H. Li, X.L. Jiang and X. Liu	311
<b>Study on Kinetics of Straw Stalk Gasification in CO<sub>2</sub> with Random Pore Model</b>	
H. Fei, J.M. Shi, Y.L. Li and K. Luo	316
<b>Adsorption of Enzyme on Modified Diatomite by Organo-Functional Group and Metallic Ions</b>	
W.W. Huan, M.J. Tian, Z.Y. Wang and Y.X. Yang	321
<b>Purification of Astragalus Polysaccharide with Macroporous Resins</b>	
C.L. Li, X.L. Shi, Y. Men, L. Yang and A.M. Yang	326
<b>Purification and Characterization of an Extracellular Cold-Active Protease Produced by the Psychrotrophic <i>Bacterium serratia</i> Sp. WJ39</b>	
X.L. Ji, M.K. Taj, X.B. Lu, L.B. Lin, Q. Zhang and Y.L. Wei	330

<b>Fabrication of Cell Outer Membrane Mimetic Surfaces on Chitosan Nanoparticles by Polyionic Complex and Template Polymerization</b>	
M. Gong, Z.F. Li, Q. Wang, K.L. Sheng, X.Q. Wang and Y.K. Gong	335
<b>Effect of Zinc on Seed Germination, Coleoptile Growth and Root Elongation of Six Pulses</b>	
L. Tao, M.Y. Guo, D. Xu and J. Ren	339
<b>Pollen Morphology and Taxonomic Significance of Chinese Morus L.</b>	
L. Liu, X.T. Shen, X.P. Chen, X.M. Fan and R.F. Chen	344
<b>Degrading Mimosine and Tannins of <i>Leucaena leucocephala</i> by Ensiling</b>	
X.Z. Chen, F. Feng, Q.H. Liu and J.G. Zhang	349
<b>Study on Optimization of Extraction Technology for Bitter Melon Seed Oil by Supercritical CO<sub>2</sub></b>	
L. Xu, H.L. Wang, C.Y. Wu, M.H. Zhou and Y.Y. Wang	354
<b>A Method of Insect Recognition Based on Spectrogram</b>	
Q. Jia, R. Min, S.G. Huang and Y. Wei	362
<b>Artificial Neural Network Modeling of Ultrasound-Assisted Polysaccharides Extraction from <i>Potentilla anserina</i> and Anti-Platelet Aggregation Activity</b>	
T. Guo, J.Q. Wei, Y. Wang, D. Su, Z. Zhang, J.P. Ma, B.Y. Zhang and P. Zhao	367
<b>The Research of Wastewater Treatment by Membrane Bioreactor (MBR)</b>	
N. Lu, J.C. Chen and G.H. Yang	376
<b>Characteristics on Soil Respiration of <i>Eucalyptus</i> Plantation with Four Years Old in Beihai of Guangxi, Southern China</b>	
J.M. Ma, M. Wu, T.T. Zhan, F. Tian and S.C. Liang	380
<b>The Application of External Drainage from Intestinal Cavity in the Surgical Treatment for Neonates with Necrotizing Enterocolitis</b>	
J.X. Zhao, C. Zhang, C.Y. Dong, X.S. Zhao and X. Fu	388
<b>Development and Evaluation of a Rapid Detection Technology of Streptococcus Pneumoniae Isolates from Specimen without Culture Based on LAMP and Bioinformatics</b>	
Y. Li, X.M. Zhang, J.J. Liu, W.J. Yu and M.C. Li	392
<b>Comparison between Laparoscopic and Open Repair of Congenital Diaphragmatic Hernia in Neonates: A Retrospective Analysis</b>	
C.Y. Dong, C. Zhang, J.X. Zhao, H.Y. Zhang and X.S. Zhao	397
<b>Reduced Postoperative Pain after Inguinal Hernia Repair with Absorbable String in Children</b>	
C. Zhang, C.Y. Dong, X.S. Zhao, J.X. Zhao, D. Dang and H.Y. Zhang	401
<b>Lung CT Image Segmentation Based on Mixture Active Contour Model</b>	
K.Q. Tao, Z. Qu and D.D. Wang	405
<b>Gesture Recognition by Analyzing Muscle Activity</b>	
A. Levanov and A. Alfimcev	410
<b>Objective Study of Palm Diagnosis of Traditional Chinese Medicine</b>	
Y.C. Wang, S.X. Peng, J.J. Yan, Y.Q. Wang, Y.M. Hao, R. Guo and G.P. Liu	415
<b><i>In Vivo</i> Antioxidant Activity of Black Soybean Peptide in Aging Mice Caused by D-Galactose</b>	
Y.H. Wu, E.Q. Liu, J.P. Zhang, S.L. Chen, Y. Li and Z.H. Geng	421
<b>Chemical Constituents from the Root and Stem of <i>Zanthoxylum avicennae</i></b>	
T. Guo, X.F. Tang, J.B. Zhang, J.Q. Wei, Y. Wang, Y.H. Li and Z. Zhang	426
<b>Porous Silicon as Functionalized Material for Biomedical Application</b>	
X.F. Zhang, H.X. Dong and Y.Y. Chou	431

## **Chapter 4: Design and Manufacture in Mechanical Engineering, Engineering Management of Production**

<b>The Design of Gun-Drill Sharpening Device</b>	
L. Zhu and Y. Geng	439
<b>Precision Analysis of the Surface Reconstruction Model Based on Geomagic Qualify</b>	
W. Wang, D.Q. Gao and J.M. Yi	443
<b>Research on the Connection Type between Evaporating Tube Bundle and a Steam Drum Shell on a Natural Circulation Marine Supercharged Boiler</b>	
X.W. Zheng, X.C. Hu, Z.Y. Wang and A.L. Miao	448

<b>Research on Burrs Detection of Parts Surface Based on Threshold Segmentation</b> Y. Zhang, X.R. Chen, H.L. Li, F.S. Tan and J.F. Yan	453
<b>Adaptive Stochastic Resonance Method for Early Fault Detection of Rotating Machinery Based on Alpha Stable Distribution</b> G. Yu and Y. Chen	458
<b>Harmonic Response Analysis and Tests of Three-Cylinder Fracturing Pump</b> G.H. Wu, M. Wu and H.Y. Qiu	463
<b>Variable Universe Fuzzy PID Control for Minimally Invasive Operation Robotic Catheter System</b> J.B. Shi	470
<b>Study on Pre-Mixed Micro Abrasive Water Jet Machining System</b> Z.W. Liu and R.Y. Liu	475
<b>Study on the Fusion of the Train 5T System</b> J. Yan, J.H. Yue and H. Yang	480
<b>Multi-Criteria-Decision-Making of Floating Supports with Large-Capacity OWT at Deep Water</b> X. Meng, A.X. Geng and X. Li	484
<b>Glass Capillary Tension Feed System Structure Design</b> S. Chen and Z.Y. Yao	492
<b>Research on Height Measure Based on Shadow Feature</b> L. Xue, W.B. Sun, H.Y. Tang and J.M. Wang	498
<b>A High Precision and Convenient Method to Analyze the Mechanics of Scissor Lift Platform under the Action of Combined Loads</b> F.P. Qu and Y. Xue	503
<b>The Experimental Analysis and Calculative Assessment of Building Energy Efficiency</b> S.V. Korniyenko	509
<b>Study on Variation of Reservoir Parameters in Different Injection Stage</b> Y. Zhang and S. Yu	514
<b>A Thin Cloud Removal Method for Optical Image Based on Improved Homomorphism Filtering</b> G. Yu, W.B. Sun, G. Liu and M.Y. Zhou	519
<b>A Sensor Array Optimization Method Based on Variance Difference for Machine Olfaction</b> R.R. Chen, D.H. Luo, Y. Sun, Y.L. Sun and H. Gholam Hossini	523
<b>Research on Imaging Simulation of Aerial Photography</b> Z.H. Liu, W.B. Sun, J.M. Wang and X.W. Bai	528
<b>Study on the Treatment Effect on the Loess Layer of Culvert Basement on Central-South Railway DK241+860 Section</b> A. Feng, Y. Zhao, Q.F. Zhan, Y.H. Jia and A.J. Zhu	533
<b>On a Way to the Self-Optimizing LTE Networks</b> A. Asmaryan and I. Borovik	538
<b>Design of a 0.7~2.6GHz Wideband Power Amplifier in 0.18-<math>\mu</math>m CMOS Process</b> Z. Yu, X.N. Fan, Z.J. Hua and C. Xu	543
<b>Design of a Capacitor Cross-Coupled Common Gate Wideband Low Noise Amplifier with Noise Canceling Technique</b> D. Song, X.N. Fan, K. Bao and Z.J. Hua	548
<b>Design of a Reconfigurable Mixer for Multi-Mode Multi-Standard Receivers</b> C.J. Gu, X.N. Fan, K. Bao and Z.J. Hua	553
<b>Design of a CMOS Voltage-Controlled Ring Oscillator with Bandgap Voltage Reference</b> C. Xu, X.N. Fan, Z.J. Hua and Z. Yu	558
<b>Design of Microcontroller Standard SPI Interface</b> L.L. Li, J.Y. He, Y.P. Zhao and J.H. Yang	563
<b>Construction and Influence Analysis of Co-Author Network Based on Network Science</b> Y.S. Yang, M.F. Zheng, Q.F. He and T.Z. Wang	569
<b>SVM-Based Credit Rating and Feature Selection</b> Y.Q. Qin, Y.D. Qi and H. Ying	573
<b>The Study on Cointegration of Macro-Economy and Bank Credit Risk</b> Q. Gao, H.L. Wu and X.B. Wu	578

<b>Study on the Value Management of Forestry Intangible Assets in the Era of Knowledge Economy</b>	
Z. Zhou, J.M. Zhang, S.H. Wang, R. Chen and W.W. Zhong	583
<b>The Research of Enveloping Hourglass Worm Modeling Accuracy Based on CREO</b>	
S.A. Chen, S.Y. Chen, Y.P. Lin and D.D. Luo	588
<b>Design of a Micro-Nano Positioning Platform Based on Stick-Slip Driving</b>	
Q.C. Guo, S.B. Liu and W.B. Rong	593
<b>Compressive Properties Study and Finite Element Analysis on Duck Eggshell</b>	
R. Zhang, S.C. Wang, K. Zhang and X.F. Xie	598
<b>Grid Material Supplier Selection Based on Entropy Weight Correction from Perspective of Low Carbon</b>	
Z.Y. Jia and B. He	603