

# Table of Contents

## Preface, Organizing Committees and Sponsors

### Solar Cells

#### A Novel Counter Electrode Based on Hierarchical Porous Carbon for Dye-Sensitized Solar Cells

G.Q. Wang, W. Xing and S.P. Zhuo 1

#### Aluminum-Doped Zinc Oxide as Transparent Electrode Materials

Y.L. Zhang, X.P. Zhang, R.Q. Tan, Y. Yang, J.H. Zhao, W.Y. Wang, P. Cui and W.J. Song 6

#### Study on Determination of I-V Curve of Dye-Sensitized Solar Cell

H.M. Tian, T. Yu and Z.G. Zou 13

#### Effect of the Residual Template on Surface Photoelectric Characteristics of Structurally-Ordered Macroporous Nanocrystalline TiO<sub>2</sub>

S.L. Wei, K.Y. Li, W.Y. Yang, C.M. Wang and J. Zhang 20

#### A Simple Texturization Approach for Mono-Crystalline Silicon Solar Cell with Low TMAH Concentration Solution

W.Y. Ou, Y. Zhang, H.L. Li, L. Zhao, C.L. Zhou, H.W. Diao, M. Liu, W.M. Lu, J. Zhang and W.J. Wang 26

#### Effects of IPA on Texturing Process for Mono-Crystalline Silicon Solar Cell in TMAH Solution

W.Y. Ou, Y. Zhang, H.L. Li, L. Zhao, C.L. Zhou, H.W. Diao, M. Liu, W.M. Lu, J. Zhang and W.J. Wang 31

#### Efficient Hybrid Infrared Solar Cells Based on P3HT and PbSe Nanocrystal Quantum Dots

Z.N. Tan, W.Q. Zhang, D.P. Qian, H. Zheng, S.Q. Xiao, Y.P. Yang, T. Zhu and J. Xu 38

#### Enhancing the Performance of Dye-Sensitized Solar Cells by Incorporating Mesoporous Carbon in Polymer Gel Electrolyte

G.Q. Wang, L. Wang and S.P. Zhuo 44

#### Excellent Surface Passivation by Silicon Dioxide Grown with a Electrochemical Method

J. Zhang, W.M. Lu, C.L. Zhou, Z.L. Wen, L. Zhao, H.L. Li, H.W. Diao, Y. Zhang and W.J. Wang 48

#### Gelation of Ionic Liquid-Based Electrolyte with Ordered Mesoporous Silica Particles for Quasi-Solid-State Dye-Sensitized Solar Cells

G.Q. Wang, L. Wang, W. Xing and S.P. Zhuo 55

#### Graded Buffer Layer Effect on Performance of the Amorphous Silicon Thin Film Solar Cells

S.Y. Lien, M.J. Yang, Y.S. Lin, C.F. Chen, P.H. Lin, C.H. Hsu, P.C. Huang and Y.M. Shen 60

#### Hydrothermal Growth of ZnO Nanowires on Patterned Seed Layer

W.G. Zhao, Q. Zhang and Z.Q. Ma 65

#### Improved Gel Electrolyte by Layered $\alpha$ -Zirconium Phosphate for Quasi-Solid-State Dye-Sensitized Solar Cells

L. Han, N. Wang, H.C. He, D.T. Kong and H.J. Chen 71

#### Influence of Polymer Concentration on Polysaccharide Electrolyte for Quasi-Solid-State Dye-Sensitized Solar Cell

Y. Yang, X.Y. Guo and X.Z. Zhao 76

#### Light Trapping in Dye Sensitized Solar Cells with Length-Modulated TiO<sub>2</sub> Nanotubes

C. Shen, L. Shen, J. Yang, J.W. Shi, F. Xu and Z.Q. Ma 82

#### Lower-Temperature Preparation and Photoelectrochemical Properties of Anatase TiO<sub>2</sub> Sol

J. Deng, J. Tao, X.L. Liu and T. Wu 87

#### Mechanism of Blue Shift of Optical Band Gap in Aluminum-Doped ZnO Thin Films with Blend Bond

L. Shen, C. Shen, J. Yang, F. Xu and Z.Q. Ma 98

#### Preparation and Characterization of Cu<sub>2</sub>ZnSnSe<sub>4</sub> Thin Films by Selenization of Electrodeposited Metal Precursors

J. Li, Z.W. Zhang, Y. Ou, W.F. Liu, G.S. Jiang and C.F. Zhu 105

#### Properties of Fe Doped Amorphous Carbon Thin Films for Photovoltaic Solar Cell Applications

X.Y. Tan, X.Z. Zhang, C.H. Wan and X.L. Gao 110

<b>Relationship between Microstructure and Photoelectron Behaviors of CdTe/Ligand Self-Assembly Quantum Dots</b>	114
W.Y. Yang, K.Y. Li, S.L. Wei, G.J. Song and J. Zhang	
<b>Solar Grade Silicon Materials and Poly-Silicon Solar Cell</b>	119
Y.C. Gao, B.T. Zhao and W.X. Gao	
<b>Synthesis of Colloidal Carbon Spheres by Hydrothermal Carbonization of Glucose at Different Initial pH</b>	123
G.H. Jiang, X.Q. Xu and G. Xu	
<b>The Application of Simulation and Optimization in the Growth of High-Purity Silicon Thin Film on Low-Purity Silicon Substrate by Liquid Phase Epitaxial</b>	130
Y.C. Gao, B.T. Zhao and W.X. Gao	
<b>The Effect of Target to Substrate Distance on the Properties of HAZO Films Deposited by Magnetron Sputtering</b>	134
W.M. Lu, J. Zhang, H.W. Diao, L. Zhao and W.J. Wang	
<b>The Study of Flower-Shaped Structure Dislocation in 4 Inch &lt;100&gt; Germanium Single Crystal</b>	141
M.M. Li, X.P. Su, D.S. Feng, J.L. Zuo, N. Li and X.W. Wang	
<b>Thermal Stability of Aluminum Doped Zinc Oxide Thin Films</b>	147
J.H. Huang, R.Q. Tan, J. Li, Y.L. Zhang, Y. Yang and W.J. Song	
<b>A Research on Energy-Saving and Environmental Impacts of Primary Magnesium and Magnesium Alloy Production in China</b>	152
F. Gao, Z. Nie, Z.H. Wang, X.Z. Gong and T.Y. Zuo	
<b>Application of <i>Mikania micrantha</i> as an Additive of High Strength Eco-Materials</b>	161
Y.P. Huang, C.C. Chien, Y.J. Liou, W.J. Huang and T.Y. Chang	
<b>Application of Rice Husk Charcoal on Remediation of Acid Soil</b>	169
C.C. Chien, Y.P. Huang, J.G. Sah, W.J. Cheng, R.Y. Chang and Y.S. Lu	
<b>CO<sub>2</sub> Emissions due to Cement Manufacture</b>	181
C. Li, X.Z. Gong, S.P. Cui, Z.H. Wang, Y. Zheng and B.C. Chi	
<b>Components of <i>Cunninghamia lanceolata</i> Heartwood Extracts</b>	188
J. Wang, J. Li and S.J. Li	
<b>Criteria for Evaluation for Eco-Material and the Case Study in Japan</b>	195
M. Nara	
<b>Experimental Research on Ultrafine Coal Powder for Methane Adsorption</b>	202
Z. ZHANG, S. Zhou and B.T. Wang	
<b>Influence of Particle Size Distribution of Fly Ash on Compressive Strength and Durability of Portland Cement Concrete</b>	211
J.P. Zhu, Q.L. Guo, D.X. Li and C.J. Li	
<b>Investigation of <i>Mikania micrantha</i> Charcoal Applied on Cultural Media</b>	216
Y.P. Huang, C.W. Peng, Y.H. Huang, T.R. Tsai, W.R. Kuo and H.C. Lin	
<b>Matrix-Based Model of the Carbon Footprint Analysis for Thermal Power Generation in China</b>	230
B.X. Sun, X.Z. Gong, Y. Liu, W.J. Chen and Z.H. Wang	
<b>PILCs as Water-Transmitting Material and Application in Planting Trees in Drought Areas</b>	239
Z. ZHANG, B.T. Wang and S. Zhou	
<b>The Adsorption Performance Study of Acid Leaching Residue of Asbestos Tailings</b>	246
J.T. Chen, Y.X. Han, S.F. Ding and S.L. Zheng	
<b>Process Behavior and Application of Dynamic Self-Adjusting Water-Transferring Composite Coat</b>	253
Z. ZHANG and H.M. Du	
<b>Reaction Mechanism between Zn<sup>2+</sup> and Diatomite in Preparation of Zn<sup>2+</sup>/Diatomite Antibacterial Agent</b>	260
N. Liang, H. Ding, Y.T. Hu and B.K. Wang	
<b>Research on the SDS + Castor Oil Aqueous Solution Used as Methane Absorption and Gas Explosion Suppression Material</b>	264
Z. ZHANG, H.M. Xu and N. Gu	
<b>Structural Characteristics of the Fly Ash Wrapped by the Super Absorbent Resin among the Plant Fiber and the Application Research on the Complex</b>	272
J. Zhao, P.Y. Deng and S.C. Chen	

<b>Subjects on Fatigue Crack Generation in High Strength Alloys for Long-Life Design</b>	278
O. Umezawa and S. Morooka	
<b>Synthesis and Characterization of a Rosin Gemini Surfactant</b>	285
Z.J. Chen, S.J. Li, B. Tian, T. Liang and Y. Jin	
<b>Synthesis of Quaternary Ammonium Salt from Rosin and its Inhibition to some Wood Decay Fungi</b>	291
Y. Jin, S.J. Li, T. Liang and Z.J. Chen	
<b>Synthesis of Zeolite 4A from Kaolin and Bauxite by Alkaline Fusion at Low Temperature</b>	298
Y.L. Zhu, Z.H. Chang, J. Pang and C.J. Xiong	
<b>Effect of Small Amount of Zn Additions on the Magnetocaloric Properties of Gd<sub>5</sub>Si<sub>2</sub>Ge<sub>2</sub> Alloy</b>	307
X.Z. Wang, J. Xiang, Z. Zeng, X.H. Hu, X.L. Hou and H. Xu	
<b>The Influence of the Purity of Gd on the Magnetocaloric Effect in Gd<sub>5</sub>Si<sub>2-x</sub>Ge<sub>2-x</sub>Zn<sub>2x</sub> Alloys</b>	311
Z. Zeng, X.Z. Wang, J. Huang, J. Xiang and X.L. Hou	
<b>The Performance Study of Aviation Fuel Added with Alcohols</b>	316
Y.L. Zhu, Z.Y. Meng, Z.H. Chang and C.J. Xiong	

## Bio-Medical Materials

<b>Biosynthesis of Carboxymethylated Bacterial Cellulose Composite for Wound Dressing</b>	322
J.W. Yu, X.L. Liu, C.S. Liu and D.P. Sun	
<b>Biotribology Behavior of Ultra-High Molecular Weight Polyethylene against Carbon/Carbon Composites Used for Hip Joint Replacement</b>	327
L.L. Zhang, H. Li, K. Li, L.J. Guo, W.F. Cao and X.T. Shen	
<b>Degradation Experiments and Modeling of PLGA Blend and Gradient Films</b>	331
H.Z. Liu, M. Qi, X.H. Zhu and Z.Y. Wei	
<b>Effect of Hydroxyapatite Matrix on the Growth of Carbon Nanotubes via a CVD System</b>	335
X.Y. Lu, B.H. Wu, Y.J. Liu, T. Qiu and J. Weng	
<b>High Temperature Stability of SiC/Ti Interface</b>	340
T.L. Ngai, C.X. Hu, W. Zheng, H. Xie and Y.Y. Li	
<b>Inhibition of Taq DNA Polymerase and DNA Exonuclease <i>ExoIII</i> by an Aqueous Nanoparticle Suspension of a Bis-Methanophosphonate Fullerene</b>	345
F. Kang and G.G. Song	
<b>Inhibitory Effect of Hydroxyapatite Nanoparticles on K562 Cells</b>	352
H.L. Dai, P. Chen, Y.C. Han, X.Y. Wang and S.P. Li	
<b>Mechanical Properties and Microstructure of Short Carbon Fiber Reinforced Hydroxyapatite Bio-Composite</b>	357
X.G. Wang, W.L. Gu and Z.W. Niu	
<b>Modification of Pearl Surface Microstructure by Rare Earth Cerium Induced Growing</b>	362
W.L. Shi and X.Y. Ma	
<b>Preparation and Characterization of Zn-Containing Hydroxyapatite/TiO<sub>2</sub> Composite Coatings on Ti Alloys</b>	367
M. Qi, D.Y. Yang, J.Y. Zhang and H.J. Ai	
<b>Strontium-Borosilicate-Co-Effects to Stimulate Bone Regeneration</b>	371
Y.H. Shen, K.B. Zhang, H.B. Pan, W.W. Lu, Z.M. Zheng, D.P. Wang, L.F. Deng, N. Zhou and W.H. Huang	
<b>Mechanism of High Fracture Strength of Bone</b>	379
B. Chen, D.G. Yin, Q. Yuan, J. Luo and J.H. Fan	
<b>Study on the Cytotoxicity <i>In Vitro</i> of Composite Materials Based on Poly(L-Lactide-Co-Glycolide) and Bioactive Glass</b>	384
Z.H. Zhou, Y.Y. Gao, Q.F. Yi, Q.Q. Liu and L.H. Liu	
<b>Synthesis, Microstructure and Properties of Poly(L-Lactic Acid-Co-<math>\alpha</math>-Alanine) Obtained by Direct Melting Copolymerization</b>	390
L. Liu, X.W. Chen, P. Wang, Z.Y. Wei, C.Y. Liu and M. Qi	
<b>Tetracycline Double Labelling Tracing Investigation for <i>In Vivo</i> Osteogenetic Course of PDLLA/HA Composite</b>	394
X.Y. Wang, X.Z. Shan, Y.C. Han and S.P. Li	