

## Mechanical Engineering, Materials and Information Technology II

Selected, peer reviewed papers from the 2014 2nd International Conference on Mechanical Engineering, Civil Engineering and Material Engineering (MECEM 2014), September 27-28, 2014, Wuhan, China

von  
B. Xu

1. Auflage

Trans Tech Publications 2014

Verlag C.H. Beck im Internet:  
[www.beck.de](http://www.beck.de)

ISBN 978 3 03835 293 8

# Table of Contents

## Preface, Committees and Sponsors

## Chapter 1: Material Science and Chemical Engineering

<b>Study on the Preparation Process of Photocatalysts by the Acidolysis of High Titanium Slag with Hydrochloric Acid</b> X.F. Lei, C. Chen, X. Li, X.X. Xue and H. Yang	3
<b>Preparation of Acrylated Epoxidized Soybean Oil with Excellent Properties</b> X.M. Chu, S.J. Liu and F.Q. Zhao	7
<b>The Limy Composite Binder with the Use of the Synthesized Aluminosilicates</b> V.I. Loganina, L.V. Makarova, R.V. Tarasov and A.D. Ryzhov	11
<b>A New Geometric Model for Three-Dimensional Braided Composites</b> C.B. Ni and G.F. Wei	15
<b>Dielectric Relaxation Measurements in <math>\text{La}_{1.94}\text{Ba}_{0.06}\text{Mo}_{2-y}\text{W}_y\text{O}_{9-\delta}</math> (<math>y=0, 1.0</math>) Oxide-Ion Conductors</b> D. Li, B. Wang, P. Gong, J. Li and X.H. Li	20
<b>Mechanical Properties of Polypropylene Fiber Concrete after High Temperature</b> X. Du, Y.L. Chen, Y.C. Li, D.X. Nie and J. Huang	24
<b>Electrospun Nanofibers for Fast Dissolution of Naproxen Prepared Using a Coaxial Process with Ethanol as a Shell Fluid</b> Y.H. Wu, D.G. Yu, H.C. Li and D.N. Feng	29
<b>Study on Mg-Y-Mishmetal-Zr Alloy Melt Reaction</b> M.L. Ma, K. Zhang, J.W. Yuang and X. Feng	33
<b>The Influence of Modified Polytetrafluoroethylene(PTFE) on the Properties of PA6/PTFE Blends</b> J. Liu, H. Lin, H.L. Yi, T. Wei and B.C. Zheng	38
<b>Experimental Study on De-Fluorinating by Adding Dilute Alkali in Wet Phosphoric Acid Extraction Organic Phase</b> H.Y. Zhang, J. Yang, D.Z. Ming and Z.X. Li	46
<b>Problems and Countermeasures in the Application of the Fire Chemical Detection Equipment Based on Material Properties</b> Y.Y. Wang	51
<b>Metal-Catalyzed Synthesis of a Monomethine Cyanine</b> C.J. Wang, S.S. Gong and Q. Sun	55
<b>Efficient Synthesis of DiAZT Triphosphate</b> S.S. Gong and Q. Sun	59
<b>Preparation of Bis-Functionalized 1,4-Diaminobutane Derivatives</b> X.C. Li, S.S. Gong and Q. Sun	63
<b>Efficient Synthesis of Functionalized 3-Aminopropanols</b> X.C. Li, S.S. Gong and Q. Sun	67
<b>Preparation of Adenosine-Containing Artificial Dinucleoside Triphosphates</b> Z.B. Xie, S.S. Gong and Q. Sun	71
<b>The Factors Affecting the Surface Properties of W-Implanted H13 Steel</b> J.H. Yang, S. Li and X.J. Ma	75
<b>Synthesis and Photochromism Studies of 1-(2,5-Dimethyl-3-Thienyl)-2-[2-Methyl-5-Pyrenyl-3-Thienyl]Perfluorocyclopentene</b> X.R. Dong, R.J. Wang and S.Z. Pu	79
<b>Synthesis and Properties of 1-(2-Cyano-1,5-Dimethyl-4-Pyrryl)-2-{2-Methyl-[5-(4-Methylene-Hydroxyl)Phenyl]-3-Thienyl}Perfluorocyclopentene</b> F. Duan and G. Liu	83
<b>Synthesis and Application of 1-[2-Methyl-5-Phenyl-3-Thiophene]-2-[2-Methyl-5-Phenyl-(4-Vinyl)-3-Thiophene]Perfluorocyclopentene</b> Y.L. Fu, X. Li and G. Liu	87

<b>Synthesis and Properties Study of 1-(2,4-Dimethoxyl-5-Pyrimidinyl)-2-[2-Methyl-5-(3-Cyano)-3-Thienyl]Perfluorocyclopentene</b> D.H. Jiang and G. Liu	91
<b>Research on Photochromic Materials with Synthesis and Properties of 1-(2-Methyl-3-Benzothiophene)-2-[2-Methyl-5-(3-Cyanophenyl)-3-Thienyl]Perfluorocyclopentene</b> G.M. Liao, C.H. Zheng and S.Z. Pu	95
<b>Synthesis and Properties Study of 1-[2-Methyl-5-(3-Trifluoromethyl)-3-Thienyl]-2-[2-Methyl-5-(9-Phenanthrene)-3-Thienyl]Perfluorocyclopentene</b> J.J. Liu, H.J. Jia and S.Z. Pu	99
<b>Synthesis and Properties of 1,2-Bis[2-Methyl-5-(9,9-Dihexyl-Fluorene)-3-Thienyl]Perfluorocyclopentene</b> L.L. Ma and G. Liu	103
<b>Synthesis, Photochromism and Fluorescent Switch of 1-(2-Methyl-1-Benzofuran-3-Yl)-2-(2-Methyl-5-(4-Benzylazide)-3-Thienyl)Perfluorocyclopentene</b> Z.Y. Tian, S.Q. Cui and S.Z. Pu	107
<b>Synthesis and Properties of 1-[2-Methyl-5-(3-Cyanophenyl)-3-Thienyl]-2-[2-Methyl-5-(4-Pentylphenyl)-3-Thienyl]Perfluorocyclopentene</b> C.C. Zhang, X.D. Zhang and S.Z. Pu	111
<b>Applied-Information Technology in Concentration Depth Profile of Multi-Charged Mo Ion Implantation</b> J.H. Yang and X.J. Ma	115

## **Chapter 2: Construction and Environmental Engineering**

<b>Research on Formation, Influence and Regulation of Eco-Environmental Frangibility of Recreation Area of Urban Islets in River</b> C.Q. Huang and H.J. Peng	121
<b>Study on Ultrasonic Degradation of Methyl Orange Wastewater by Modified Steel Slag</b> X.F. Lei, C. Chen, X. Li, X.X. Xue and H. Yang	125
<b>Architecture Study on the Whole Lifecycle Management of Construction Contract in the Large Construction Projects</b> H. Liu and W.J. Sun	129
<b>Hydromechanics Study on Lahars of the Erdaobai River Basin, Changbai Mountains, China</b> Q.F. Yang, H.R. Ma and Y. Zhang	135
<b>Recovery of Copper by Electrodeposition Method from Electroplating Wastewater</b> S. Fan, J.S. Wang, Q.W. Guo, W.M. Zhang and P. Sun	141
<b>Buckling of Thin-Walled Cylindrical Shells of Desulphurizing Tower under Wind Loading</b> L.C. Pan and D.F. Wang	147
<b>Numerical Simulation on Characteristics of Nitrate Nitrogen Leaching under Different Irrigation Levels</b> S.H. Ji and J.Y. Deng	153
<b>Shape Optimization Design of Gravity Buttress of Arch Dam Based on Asynchronous Particle Swarm Optimization Method</b> L. Xu	160
<b>Determine the Reinforcement Effect of Gravel Layer on a Sandy Foundation</b> S.A. Matveev, E.A. Martynov and N.N. Litvinov	164
<b>Seismic Mechanics and Engineering Application Analysis of Shear Wave Velocity Inferring</b> J.J. Qi, Z.Q. Yin and K.B. Wu	168
<b>Information Processing in Significance in Legislation of China's Environmental Protection Tax - Viewed from the EKC Curve</b> B.X. Gao, J. Chen and G.H. Zhang	173

## **Chapter 3: Machinery, Automation and Control**

<b>Effects of Different Vents Location on Flow Characteristics of Air Conditioning</b> Z.B. Luo	179
--	-----

<b>Design of Bilateral Automatic Window Cleaning Device Based on Solid Edge</b> G.L. Xu and T. Wu	183
<b>Comparing and Simulation of APF Control Strategies with Time Varying Inductive Load</b> J.B. Wan, L.X. Zhang, Z.Y. Wei and W. Kang	187
<b>Dynamic Optimization of Ship Boiler Startup Based on Modelica and JModelica.org</b> G.Q. Zhu, L. Yang and G. Cheng	191
<b>Study on Residual Strength of Corroded Pipes</b> D.P. Yang, Y.M. Wang, Y.F. Cao, F.L. Long and G.Q. Niu	196
<b>Study on Calculating Takeoff Distances on Non-Dry Runways</b> Y. Qian	204
<b>Applied Technology in Simulation of Photovoltaic Cell Model Based on MATLAB/Simulink</b> S. Shi and Z.X. Zhou	209
<b>Finite Element Analysis on Hybrid City Bus Frame Based on ANSYS-Workbench14</b> M.L. Wan, Z.Q. Dai and H.X. Zhang	214
<b>Applied Information Technology in Fault Diagnosis of Marine Lube Oil System Based on Bayesian Network Inference</b> W. Xu, G. Cheng, Y.T. Chen and F.M. Zeng	220
<b>Applied Technology in Diaper-Based UTI Testing for Elder People by Using Nitrite Ion Selective Electrode</b> S.L. Feng and T. Dong	225

## **Chapter 4: Communication, Computational Algorithms and Applied Information Technology**

<b>Design of the High-Speed X-Band Frequency Hopping Source</b> S. Zhao and D.R. Chen	231
<b>Design of the Millimeter-Wave Receiver</b> S. Zhao and D.R. Chen	235
<b>Design of the Millimeter-Wave Microstrip Array Antenna</b> S. Zhao and D.R. Chen	239
<b>Research on the Circular Polarization Microstrip Array Antenna</b> S. Zhao and D.R. Chen	243
<b>Research on the Angle Measurement Algorithm for Low-Speed Target of Radar</b> S. Zhao and L. Chen	247
<b>The Design and Application of Information and Communication Networking Training Needs Analysis Simulation System</b> Y.J. Peng and P.F. Zhu	251
<b>Applied-Information Technology with Mutil-Agent Cooperation in Education Model Control Engineering</b> J.H. Ma, H. Zhang and B.F. He	255
<b>Applied-Information Technology in Short-Term Wind Speed Forecast Model for Wind Farms Based on Ant Colony Optimization and BP Neural Network</b> Q.D. Zhao, Y. Yu and M.M. Jia	259
<b>Study on Content Distribute Mechanism of Cloud Storage</b> C.P. Wang	263
<b>Self-Cooperative Network Coding in Deep Space Communications</b> J. Li, K. Chen and L.G. Xie	267
<b>Applied-Information Technology and Data Processing in Determination of Subjective Weights in Multiple Attribute Decision Making</b> B.P. Su and H.Y. Su	271
<b>Applied Technology with an Improved EGO Algorithm for Incremental Kriging</b> Y.H. Li, Y.Z. Wu, Z.D. Huang and S.T. Wang	277