

International Symposium on Polymer Composites and Polymer Testing 2012 (ISPCPT 2012)

Advanced Materials Research Volume 499

**Hangzhou, China
23-25 March 2012**

Editors:

**Hongkui Mao
Deepak Aggarwal
Lee Menghai**

**Liu Hongfei
Zhao Maotai**

**ISBN: 978-1-61839-961-8
ISSN: 1022-6680**

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by Trans Tech Publications Ltd.
All rights reserved.

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact Trans Tech Publications Ltd.
at the address below.

Trans Tech Publications Ltd.
Laubisrutisr 24
CH-8712 Stafa-Zuerich
Switzerland

Fax: +41 (44) 922 10 33 Fax: +1 (603) 632-5611
e-mail: sales@ttp.net

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

Preface and Committee

Chapter 1: Polymer Composites and Applied Materials

A Magnetic Array Fabricated by a Novel Process Constructed with Photosensitive Polyimide-Ferrite Nanocomposite Y.X. Li, H.W. Zhang, Y.L. Liu and J. Li	3
Effect of Liquid Structural Transition on the Morphology of Solid/Liquid Interface during the Unsteady-State Unidirectional Solidification G.H. Ding and M. Li	7
Effect of Particle Size of Natural Graphite on Methyl Blue Sorption Behavior of Expanded Graphite L. Ji and M.L. Wang	12
Expansion Mechanism of Expandable Graphite Formed by Natural Graphite with Different Particle Size M.L. Wang and L. Ji	16
Finite Element Implementations to Predict the Failure of Composite Laminates Under Uniaxial Tension N. Rahimi, M. Musa, A.K. Hussain and J. Mahmud	20
Improved Physical and Electrochemical Hydrogen Storage Kinetics of the $Mg_{20}Ni_{10-X}Mx$ ($M=Cu, Co; X=0, 4$) Alloys by Melt Spinning Y.H. Zhang, L.Z. Guo, H.W. Shang, Z.H. Hou, Y. Cai and D.L. Zhao	25
Influence of Bi_2O_3 on the Structure and Magnetic Properties of Barium Ferrite Powders Materials J. Li, H.W. Zhang, Y.X. Li, H. Su and Y.B. Ma	31
Investigation about Synthesis of Carbon Nanotubes with Various Structures Governed by Temperature and Relevant Growth Mechanism H.P. Li, J.W. Fan, H.S. Wang and L.H. Wang	35
Investigation of Structure and Properties of PET Multifilament Irradiated with UV in Different Atmosphere Y.W. Liu, H.Y. Wang, J.Y. Li and B. Sun	40
Microstructure and Mechanical Properties of Mg-6Al-0.3Mn-0.9Y Alloy G.H. Su, Z.Y. Cao, X.R. Liu and Y. Sun	44
Microstructure and Wear Resisting Property of 40Cr Steel Treated by Supersonic Particles Bombarding Y.L. Liu and T.Y. Xiong	49
Perfluoropolyether Modified Waterborne Shape Memory Polyurethaneurea Ionomers for Potential Medical Implant Application Q.X. Li and Z.Y. Hou	53
Photodecomposition of Methylene Blue by the S, Al Doped TiO_2 Mesoporous Materials Y. Su, S.Y. Liu and W.H. Tang	58
Preparation Mechanism of Electrostatic Self-Assembled Polyelectrolyte Film Using Quartz Crystal Microbalance N.M. Hao, D.Z. Zhang, B.K. Xia, K. Wang and C.Y. Wan	63
Self-Piercing Riveting Process Simulation of Joining Aluminium Alloy Sheets B. Wang, H.Y. Zhang, F.F. Dong and T.Y. Zhu	67
Size Effect of Expandable Graphite Y. Lu	72
Size-Dependent Young's Modulus of the FCC Metallic Films M. Li and G.H. Su	76
Structure and Properties of Composite Films of Cellulose and Chitosan from Ionic Liquid H.F. Wang, W.H. Huang and Z.K. Wang	80
Study of the Preparation and Degradable Characteristics of $CaCO_3$-PE Film X.Y. Zhou, X.Y. Liu, L. Lu, L. Gu and J.J. Liu	85

Polymer Composites and Polymer Testing

Surface Properties of UHMWPE Fiber after Low Temperature Argon-Plasma Treatment J.Y. Xu, W.Y. Wang and X. Jin	90
Synthesis and Characterization of Novel PCA-PEG-PCA Triblock Copolymer J. Chang, C.W. Li and G. Li	95
Synthesis and Characterization of Polyesters Containing 5-Fluorouracil in the Main Chain J. Chang, C.W. Li and G. Li	99
Synthesis of Poly(Urethane-Urea)s from Polycarbonate Macrodiols and IPDI with the Addition of Derivant of Propylene Carbonate J.X. Zhu, Y.L. Ma and Y.D. Zhang	104
The Effect of Fatty Acid on Phase Behaviors of Tween 80/bmimPF₆/toluene Microemulsions Y.J. Zheng, H. Gao and W.M.J. Eli	108
The Electrochemical Performance of Carboxymethyl Cellulose with Different DS as a Binding Material in Lithium Batteries H.Y. Hao and Z.Q. Shao	114

Chapter 2: Applied Mechanics and Manufacturing Technology

Design of Rupture Strength Based on Confidence Level of HK40 Steel J.B. Pei, Y.F. Zhao, S.P. Yu and J. Zhao	123
An Approach for Analysis of Bulged Profile and Thickness Distribution of Tube in Free Hydro-Bulging Process X.F. Liu, L.F. Yang and Y.X. Zhang	127
Numerical Investigation of Air Flow Distribution in a Swirling Fluidized Bed M. Faizal, S. Md Seri, S. Ezamuddin and V.R. Raghavan	132
Approach of Selecting Profile Modifications Curves for Spur Gears Z. Yuan and Y. Guo	138
Preparation and Properties of a Custom-Designed Nickel-Based Amorphous Brazing Foil B. Wang, T.Y. Zhu, F.F. Dong and Y.Q. Shen	143
Investigation on the Process Characteristics of Laser Cladding Fabrication Using 45 Carbon Steel Wire J. Sun and S. Sekou	147
Pilot Study of Three-Stage Catalytic Ozonation - Biological Activated Carbon for Drinking Water Advanced Treatment G.M. Zhang and Q.Q. Shen	152
Finite Element Analysis for Homogeneous Earth Dam of Heisonglin Reservoir W.L. Ma and X.F. Li	156
The Abstract Device Models and the General Mathematical Models for Energy and Exergy Analyse in Papermaking Mill Y.M. Zhou, J.G. Li and H.B. Liu	160
Effects of Ball Milling Time on the Microwave Properties of Mg₄Nb₂O₉ Ceramics by the Solid-State Process H.T. Wu, Y.S. Jiang, Y.Z. Wang, Y.M. Chen and Y.L. Yue	165
Pilot Study of Coagulation-Direct Filtration for Low-Temperature and Low-Turbidity Source Water G.M. Zhang, X. Kang and W. Zhao	170
Study on the Phase Formation of Corundum-Type Mg₄Nb₂O₉ Powders by the Solid-State Process Y.S. Jiang, Y.Z. Wang, Y.M. Chen, Y.L. Yue and H.T. Wu	174
Effects of Sintering Temperatures on Microwave Properties of Mg₄Nb₂O₉ Ceramics by the Solid-State Process Y.S. Jiang, Y.Z. Wang, Y.M. Chen, Y.L. Yue and H.T. Wu	178
The Optimization Design of Certain FRP Sluice Gate J. He, Y.X. Yang and M.S. Wang	183
Effects of Holding Time on Microwave Properties of Mg₄Nb₂O₉ Ceramics by the Solid-State Process H.T. Wu, Y.S. Jiang, Y.Z. Wang, Y.M. Chen and Y.L. Yue	188
Advances in Process Technology of Sepiolite Mineral Fibrous Materials M.M. Cheng, F. Wang, L.J. Ma and C. Fan	193

Quantitative Analysis of Residence Time Distribution in Kenics Static Mixer D. Jin, H.L. Fu, J.H. Wu and D. Sun	198
Motion Trajectory Analysis of Potting Knife in Pot-Making Mechanism Based on Pro/E W.D. Yin, Y.Z. Gao and P. Zhou	203
The Finite Element Simulation of Milling Based on Orthogonal Cutting Model A.H. Gao, F.R. Wang and J.X. Zhang	208
Theory Analysis of FBG Characteristics under 3D Homogeneous Stress Field Z.X. Wu, H.F. Zhang, J.W. Wang and L.F. Wang	213
Comparative Study of RANS and LES Simulation Methods for Analysis of Turbulence in a Tubular Stirred Reactor Q.Y. Zhao, T.A. Zhang, Y. Liu, X.C. Cao, S.C. Wang and H.L. Zhao	218
Fabrication of C/Cu Composites by Mechanical Activation and Spark Plasma Sintering X.R. Liu, Y.B. Liu, Y. Sun and G.H. Su	223
Research on Oil Change Period of LNG and Diesel Engine Bus W.W. Huang, F.S. Meng and Q. Zhang	227
Main Parameters Calculation and Performance Test of 7YGS-45 Type Self-Propelled Dual-Track Orchard Transport J.J. Xing, S.J. Li and Y.L. Zhang	232
Dynamics Analysis of Refrigeration Compressor Based on Finite Element and Experimental Modes L. Zhang, H. Wu, Y.J. Gong and S. Zhang	238
A Numerical Analysis for Cracks Emanating from a Quarter-Spherical Cavity on the Edge of an Elastic Body L.H. Yan and B.L. Liu	243
Design of Double-Light Shadowless Lifting Retractor J. Sun, B. Xiang, P. Zhou and R. Wang	248
Investigation on Moiré in Multicolor Overprinting W.Y. Jiang	253
Theoretical Research of Residual Stress on H-Beam Roller Straightening X.W. Liu, S.Q. Zhang, H.G. Wang and H.S. Liu	258
Impact of Step Height on Deformation of Foundation for Wind Power Generator System J. Tian, Y. Guo and D. Zhang	263
Application Research on Fault Diagnosis Based on Improved Wavelet Neural Network J.J. Li, J. Li, R. Qu and Y. Li	268
Adaptive Synchronization for a Class of Switched Chaotic Systems with Uncertainty F.Y. Wang, L.M. Du, G. Li and J.X. Pian	273
High Temperature Tribological Behavior of Ball Milled Expanded Graphite/Iron Powders H. Wang, Y. Guo and S.Y. Wang	278
Earthquake Response of Asymmetric Structure Considering Soil-Structure Interaction in Time Domain M.L. Wang, J.X. Lan and X.R. Yang	282
Simulation of Cavitation Erosion in Different Throttling Pipelines B. Zhu, Y. Su and Z.G. Li	288
Research on Reproduction Characteristics of Digital Laser Plate X.L. Huang and W.Y. Jiang	293
Numerical Simulation of Steel Plate Processed by Shot-Peening J.X. Lan, M.L. Wang, Y.Z. Wu and X.R. Yang	298
General Rotation Union Design Experiment for Seed Dispensing Performance of Seed Metering Disc Y.Z. Gao, W.D. Yin and P. Zhou	303
Rheological Behavior of Diamond Particle/Epoxy Resin Adhesive Adapted to Screen Printing Y. Lv, S. Ci and L. Zhu	308
Research of the Factor that Influence the Ink Printing Density of Water-Based Gravure Ink M.J. Yu, B.Q. Huang and X.F. Wei	312
Study on the Deformation and Fracture of Bolted Roadway with Infrared Characteristics R.L. Yan, Y.J. Zhang, L.Q. An and L.T. Mao	317

Polymer Composites and Polymer Testing

Three-Dimensional Finite Element Simulation Analysis of Jinliang Rive Inverted Siphon Structure Y. Liu	322
Finite Element Method Mechanical Characteristics Analysis of Tower Foundation for Wind Turbine Generator System J.W. Wang, X.Y. Xu, D. Zhang and J. Tian	327
Application of Finite Element Method in Structure Analysis for Inclined Clay-Core Wall Earth Dam J.H. Zhang	331
Dynamic Inverse Model for Multi-Sensor Measurement System Based on Wavelet Neural Network D.Z. Zhang, B.K. Xia, K. Wang, J. Tong and N.Z. Yang	335
A New Numerical Analysis for Inclined Crack in an Infinite Plate B.L. Liu and L.H. Yan	340
Analysis and Evaluation on Detectability of Characteristic Index for Coal Property G. Cheng, H.L. Zhang, Q. Fu and W. Su	344
Influence of Processing Methods on Number and Form of Cracks of Bionic Units on Vermicular Cast Iron Y. Liu, H. Zhou, J.Y. Cheng and L.Q. Ren	350
Research on Distribution for Soot Remain Different Height in Smoldering Fire Y.Y. Chu, Y.Y. Li and D. Liang	355
Adaptive Switching Control for Projected Synchronization of Chaotic Systems with Uncertainties L.M. Du, F.Y. Wang, J.X. Pian and Z.Y. Han	360
Application of Machine Vision Technology in the Detection of Industrial Products S. Liu, C. Sun, W.W. Li and W. Wei	366
Test Methods for Suspended Load Abrasion and Bed Load Abrasion on Hydraulic Concrete P. Dai, J.T. Ding and Y. Bai	370
Experimental Investigation on Water Miscible Rolling Lubricant J4 X.D. Peng	376
An Optimal Study of the Preparation Conditions of Urea-Modified Titanium Ore Adsorbent X.F. Lei, X.X. Xue, H. Yang and X.Q. Xia	380
Wear Resistance Experimental Analysis of Closed Extruding Fine Blanking Parts Surface M. Deng, M.M. Chen and G.S. Ning	384
Force Performance Research for the Interior Joint of New Light-Weight Portal Rigid Frame Z. Huang, L.Z. Jiang and W.B. Zhou	388
 Chapter 3: Other Related Topics	
Numerical Simulation of Three-Component Induction Resistivity Log S.L. Luo, L.X. Li, Y. Cui, Q.B. Ma and X.P. Liao	395
Low Voltage Ride through (LVRT) Control of Double-Fed Wind-Driven Generator J.H. Zheng, J.F. Li and Y.Z. Gao	400
Use KMnO₄ to Control Bromate Formation during Drinking Water Ozonation: Influencing Factors X. Kang and G.M. Zhang	405
An Effective Thermal Flow Meter Based on TDC-GP1 Chip J. Hou, W.J. Zhang and Y.L. Sun	409
Near-Infrared Spectroscopic Measurement of Organic Matter in Soil T. Pan, Z.T. Wu and J.M. Chen	414
Study on the Removal of Copper Ions from Water Using Eco-Friendly Attapulgite/Chitosan Composites Y. Chen, H. Xu, J.B. Sun and C.L. Zhang	419
The Linear Auto Disturbances Rejection Controller Application in Beam Magnetic Suspension System of Gantry Moving Type Numerical Control Machine Tool C.F. Liu, X.M. Ren and L.M. Wang	423

Robust H_{∞} Control with Actuator Faults G.M. Li	428
Electrochemical Sensors for L-Tryptophan Based on Molecularly Imprinted Polymers W. Xu, X. Li, W.Y. Zhang and X.G. Ying	434
The Synchronization Control of Gantry Machining Center Magnetic Suspension System Base on ModelReference Fuzzy Adaptive C.F. Liu, Y.L. Xing and T. Wang	439
Design of Temperature Measured Terminal with GPRS in the Central Heating Room and Research of the Charging Method by Indoor Temperature Measured W.J. Zhang, G. Yang, Y. Zhang and K. He	445
Development of Data Recording and Analysis System for Urban Rail Vehicle F.J. Zhang, P. Zhou and L.G. Li	450
Estrogenicity of Six Typical Aqueous Pollutants G.M. Zhang and L. Lang	455
Study of Remote Elevator Monitoring Fault Detection System J. Liu, D.S. Fan, Y. Wu, G.J. Fu and M.J. Liu	459
Research of the Distance Calculation Algorithm Based on RSSI K.S. Chen, Z.H. Xu and L.Y. Gong	464
Fuzzy Control Tuning Method of Digital PID Parameters Y.Z. Huo, G.L. Niu, S.J. Ma and X. Du	469
Research on Aluminum Electrolysis Equipment Control Strategy J.J. Li, G.Q. Chen, H. Wu and Y. Li	474
Study on Integral Summation Algorithm for Measurement of Superfine Scale Based on Fraunhofer Diffraction C.X. Liu, W. Jin and D. Ye	478
Gear Transmission Fault Tree Analysis Based on Bayesian Network Z. Zhou, J.B. Zhang, D.Z. Ma, Y. Qin and B. Zhang	482
Calculation of Magnetic Susceptibility and Conversion of Units H.W. Zhao	487
Theory Analysis of Three-Component Induction Resistivity Log S.L. Luo, L.X. Li, M. Li, Q.B. Ma and B.Q. He	491