Materials and Measurement

Selected, peer reviewed papers from the 2013 International Conference on Intelligent Materials and Measurement (ICIMM 2013)

Advanced Materials Research Volume 804

Singapore 27 - 28 July 2013

Editors:

Dayun Xu

ISBN: 978-1-62993-629-1

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[©] (2013) by Trans Tech Publications Ltd. All rights reserved.

Printed by Curran Associates, Inc. (2014)

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 Organizing Committees

Chapter 1: Materials Science and Materials Processing Technology

The Influence of Substrate Temperature on the Morphological and Optical Properties of	
ZnTiO ₃ Thin Films Prepared by Magnetron Sputtering C. Zhan, W.J. Ke, X.M. Li, W.L. Du, L.J. Wang and C. Ye	3
Review of Mechanical Properties and Durability of PVA Fiber Reinforced Cement Based Composite Materials	
X.B. Dai, P. Zhang and J.X. Gao	8
The Effect of Superplasticizer on Strength and Chloride Permeability of Concrete Containing GGBFS	10
S.Y. Zhang, Y.F. Fan and N.N. Li	12
Picosecond Laser Micromachining of Ultra-Hard AlMgB ₁₄ Thin Films A. Melaibari and P. Molian	17
Quantitative Analysis of Mixtures Using Terahertz Time-Domain Spectroscopy and Different PLS Algorithms T. Chen, Z. Li, F.R. Hu and W. Mo	23
Synthesis and Characterization of a Flame Retardant Dimethyl Methyl Phosphonate	
(DMMP) and its Application in FRP Z. Wang, S.J. Gao, X.X. Che and C.H. Shen	29
Cyclic MAM Synthesis of CaMoO ₄ :Er ³⁺ /Yb ³⁺ Particles and their Upconversion Photoluminescence Properties	
C.S. Lim	36
Sintering Character of Coated Al ₂ O ₃ -Y ₂ O ₃ /ZrB ₂ Composite Powder Materials via Spark Plasma Sintering	
J.G. Song, M.H. Xu, X.Q. Wang, S.B. Li and G.C. Ji	42
Effect of Ball Milling Methods on the Properties of Quartz Sand Powder Materials from the Yangtze River	
Z.W. Qiu, J.Y. Cheng, J.F. Zhou, Q.Q. He, X.D. Ma, Z.W. Wang, X.C. Chen, Y.P. Feng, T.T. Xie, Q. Li, J.G. Song, S.B. Li, F. Wang, X.Q. Wang and R.J. Liu	47
Preparation and Characterization of Quartz Porous Ceramic Materials Using the Yangtze	
River Sand Y.P. Feng, Z.W. Qiu, X.B. Ma, L. Zhao, X.C. Chen, Q.Q. He, J.F. Zhou, X.D. Ma, Z.W. Wang, Q. Li, J.G. Song, W. Fu, F. Wang, S.B. Li, X.Q. Wang and R.J. Liu	52
Effect of Sodium Tripolyphosphate on Color Stability of In-Office Bleached Teeth H.Q. Chen and B. Huang	57
Anodized Preparation of Titanium Dioxide Nanotube Arrays and Photocatalytic	
Degradation of Chloramine Phosphorus H. Luo	62
Manufacture and Analysis of Gas-Sensitive Elements Based on Polypyrrole and its	02
Compounds with Nickel Ions E. Vorobiev, V. Petrov and E. Shishlianikova	67
Effect of BiCl₃ on the Morphology and Property of PVDF Films Y.J. Wang, F.F. Wang and L.J. Xu	74
Study on Properties of Zn-Al-Mg-RE Coatings by Arc Spraying F. Lu, Z.Q. Xie, Y.F. Lu, M. Lou, M. Zhou and X.D. Hu	79
Optimization of the NDV-N-2-HACC/CMC Microspheres Preparation Q. Chen, H. Kang, Y. Zhang, H. Wu, C.X. Dai, C. Guo, C. Shi, X. Wang, Z. Jin and K. Zhao	85
Advances of Graphene for Adsorption of Dyes in Wastewater J.Y. Yang, Y.Q. Chen, Y.C. Ma, X. Zhang, L.L. Luo, S.X. Zhong and J.R. Chen	89
Double Oxidants Combined Oxidation of Oleic Acid Preparation of Azelaic Acid C.W. Shi, X.Y. Zhang, S.L. Zhao, P. Chen and Y.T. Bai	94

Co-Continuous PPS/PA66 Composites - Part I: Phase Morphology and Structure T. Yin, Y.O. Gu, J.H. Gao and W.Y. Yu	98
Co-Continuous PPS/PA66 Composites - Part II: Mechanical Performance T. Yin, Y.Q. Gu, C.Y. Yu and Z.X. Li	102
Wood Materials Applied in Civil Engineering and Wood Industry Management in Latvia: Case Study	
K. Fedotova and S. Geipele	106
Direct Extraction of Phthalate Esters from Polymeric Gloves Materials K.P. Chao, C.S. Huang and M.L. Huang	114
Microstructures and Electrical Properties of BaTiO ₃ PTC Ceramics M.P. Chun, H.S. Shin, S.I. Hyun and B.I. Kim	118
Preparation and Characterization of Nanocomposite Microspheres of Polystyrene and Fe ₃ O ₄ by Emulsifier-Free Emulsion Polymerization Y.F. Duan, Z.X. Fu, Y. Li, H.J. Bian and S. Zhang	123
Phase Change Materials as a Modifier of Ageing Cement Concrete in Hot and Dry Climate M. Hsino and J. Pasławski	129
Nanocomposite of Ag-Polyacrylonitryle as a Selective Chlorine Sensor T.V. Semenistaya, V.V. Petrov and P. Lu	135
Effect of Liquid Polishing System on Color Stability of Bleached Enamel X.L. Chen and H.Q. Chen	141
Spherical Auxetic Shells T.C. Lim	146
Recrystallization of Ag and Ag-La Alloy Wire in Wire Bonding Process H.W. Hsueh, F.Y. Hung and T.S. Lui	151
Chapter 2: Instrumentation and Measuring Technology, Data Acquisition and Analysis	
A Newly Developed Self-Contained Inclinometer for Offshore Platform Anchor Monitoring D. Tang, M.L. Deng, F. He and Q.J. Yue	161
Three-Dimensional Digital Design for Osteotomy in the Treatment of Congenital Hemivertebra	167
H.W. Ding, G.W. Yu, Q. Tu, J.J. Shen and Y.J. Wang	167
3D Measurement of Anatomic Parameters and Development of a Digital Design to Improve the Outcome of Lower-Extremity Surgery H.W. Ding, G.W. Yu, Q. Tu, J.F. Jia, J.J. Shen and Y.J. Wang	174
The Electromagnetic Disturbance Study Based on the Observational Data from Satellite and Ground Station during a Magnetic Storm	
R. Yan, L.W. Wang and S.Z. Zhang	180
Design of Remote Real-Time Environmental Condition Monitoring System Based on Multi- Network Mergence Y. Luo	187
Green Tourism and Physical Environment Assessment Design F.S. Hung and C.H. Lee	193
HLAC-Based Feature Extraction and its Application T.T. Gao, F.Q. Liu, J. Zhu and H.J. Wang	200
Measuring Land-Use Efficiency in Land Management A. Auzins, I. Geipele and I. Stamure	205
The Hardware Design and Implement of an Image Information Collection System F.Y. Guo	211
Characterization of Rheological Properties of Low Density Polyethylene in Torque	
Rheometers X.X. Jian, W.L. Zhou, L.Q. Xiao, X.L. Hu and Q.L. Zheng	216
Force Sensor and its Application to Tuning Fork Response Measurement S. Areejit, A. Jansri and P. Sooraksa	222

S. Areejit, A. Jansri and P. Sooraksa Safety P-Cycle Protection Mechanism for Smart Power Device B. Li, K.Q. Xiong, Y. Sun and B. Qi

228

Study on Monitoring Slope Deformation with GPS in Highway of Mountainous Region Q. Shen and C.X. Chen	233
Measuring the Geographical Dispersion of World Petroleum Trade Y. Hong, H. Yuan and H.W. Su	239
Metal Magnetic Memory Signal Analysis Based on EMD Method X. Yu, J.F. Fan, W.M. Zhang and Z.C. Qiu	244
The Similarity of Pattern Recognition between Inscriptions on Oracle Bones and Cuneiform J.F. Li and H.H. Kuang	248
Comparison of Photoacoustic Behaviors between Helmholtz Cell and its Remodified One J.J. Zhao, X.H. Li, W. Zhang and Z. Zhao	251
Study and Design of College Students' Physical Activity Energy Monitor Q. Luo and W.T. Zheng	256
A Study on the Modular Designed the Elderly-Specific Bag Based on Touch X.P. Hu, X. Feng, Y. Zhou and D.L. Men	261

Chapter 3: Applied Mechanics and Civil Engineering

Minimal Control Synthesis Algorithm for Panel Vibration Control T.B. Ma and F. Du	269
Application of Intelligent Materials in Vibration Control for Strapdown Inertial Navigation	
System H. Sun, F. Li and J.H. Zhao	275
A Model of Recent Vertical Movements of Earth's Surface of the Territory of Lithuania R. Puziene, A. Anikeniene and A. Stanionis	279
Research on Aerodynamic Flow Acceleration Induced by One Atmosphere Uniform DBD Plasma Based on PIV F. Li, C. Gao, B.R. Zheng and Y.S. Wang	287
Numerical Analysis of Deformation and Failure of Penetration into Concrete Target by Projectile S. Gao, Y.B. Wang and X.F. Li	292
Study of the Hybrid Optical/Electrical Wavelength Routing Approach for OTN Backbone Network D.W. Jiang, Y. Sun, B. Li and J. Lu	298
Blocking RWA Model Analysis in Irregular OTN Topology J. Li, Y. Sun, Z.D. Wu and J.S. Li	302
Impact of Wall Openings on the Seismic Performance of Brick Masonry Structure L.H. Yang	307
Three-Dimensional Finite Element Force Analysis for Rockfill Dam of Changjiakeng Reservoir K.D. Liu	311
Simulation Analysis of Live Reinforced Concrete Rectangular-Sectioned Aqueduct T. Min	316
Finite Element Analysis of Tianerya Trench-Buried Inverted Siphon X.Z. Xie	320
Force Analysis of Wire Mesh Concrete U-Shaped Aqueduct X.Z. Xie	325
Research on Finite Element Analysis for Homogeneous Earth Dam of Maodun Reservoir X.Z. Xie	329
Failure Analysis on Heating Surface Tube Crackof High Temperature Reheater in Station Boiler	
Y.J. Jiang, X.F. Zheng, R.G. Xue, G.Z. Dong, J.F. Zhao, W.B. Li, E.S. Chen, W.P. Li and Q. Wang	333
Vibration Analysis and Simulation of the Marine Diesel Generating Sets Gear System P. Liu and B.C. Li	337
Three-Dimensional Finite Element Analysis of Henggangling Buttress Type Inverted Siphon D.Y. Ji	343
Rotating Disks Made from Materials with Negative Poisson's Ratio T.C. Lim	347

The Study on Dynamic Characteristics for Heald Frame Designed by New Type Composite	
of Carbon-Fibre	
H.F. Qiu, Y.X. Wang and S.L. Wu	353
-	

Chapter 4: Manufacture Engineering

Applying Hilbert Curve in Facilities Layout T.H. Huang, S.C. Chen, C.H. Cheng and C.Y. Wu	361
A Research Method and its Realization of Machine Tool Ergonomic Design M.J. Yu, D.K. Chen and S.H. Yu	366
Incentive Mechanism to Promote Supplier's R&D of Green Technology in Supply Chain D.Y. Zhang	370
Mechanical Analysis of the Energy Cycling Control for Further Smart Grid B. Qi, H.W. Xie, L.K. Zhang, L.L. Wang and S.S. Chen	378
Micro Grid Technology Research Based on the Distributed Generation Y.J. Sang and Y.Y. Fan	383
The Design and Implementation of Virtual Simulation Experiment Platform D.D. Li, A.H. Cai, C.H. Xian and J.C. Xu	387
Minimum Operating Cost Planning for Micro-Grid Power Source Based on Multi-Energy Source Hybrid Power Supply H. Cheng and Z.J. Liu	391
Cutting Force Prediction and Simulation for Quasi-Symmetric Milling of the Stator's Inner Helicoid	571
X.M. Liu and S.Q. Wang	396