

1st International Workshop on Materials Science and Mechanical Engineering (IWMSME 2017)

IOP Conference Series: Materials Science and Engineering
Volume 281

Kunming, China
27 – 29 October 2017

Editors:

Manuel F.M. Costa
Hamid Yaghoubi
Maria Giovanna Buonomenna

ISBN: 978-1-5108-5496-3
ISSN: 1757-8981

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© (2017) by the Institute of Physics
All rights reserved. The material featured in this book is subject to
IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of contents

Volume 281

1st International Workshop on Materials Science and Mechanical Engineering

27–29 October 2017, Kunming, China

Accepted papers received: 4 December 2017

Published online: 21 December 2017

Preface

[1st International Workshop on Materials Science and Mechanical Engineering](#)

[IWMSME2017 Committee](#)

[Peer review statement](#)

1:Materials Science

1.1 Optical/Electronic/Magnetic Materials

[Band Gap Optimization Design of Photonic Crystals Material](#)

Y Yu, B Yu and X Gao.....1

[MEMS-based Optic Fiber Fabry-Perot Sensor for Underwater Acoustic Measurement with A Wavelength-switched System](#)

J Xia, F Y Wang, H Luo, Y M Hu and S D Xiong.....8

[Measurement of the Microwave Refractive Index of Materials Based on Parallel Plate Waveguides](#)

F Zhao, J Pei, J S Kan and Q Zhao.....15

1.2 Materials Physics and Chemistry

[Synthesis and Characterization of Polyurethanes Based on Hydroxylated Tung Oil \(HTO\) and PAPI](#)

W Q Yang, J X Zhang, Z Y Ren, L Jiang, Y Fu and S Q He.....20

[Research on the Bond Anchorage Properties of Alkali-Activated Slag Cementitious Material](#)

J Zhu, W Z Zheng, Y F Leng, C Z Qin and Z Z Xu.....26

[Low-temperature Selective Catalytic Reduction of NO with NH₃ over CuO_x/CNTs Catalyst](#)

B N Ren.....34

1.3 Materials Physics and Chemistry

[Effect of Cooling Rate on the Microstructure and Mechanical Properties of C-Mn-Al-Si-Nb Hot-Rolled TRIP Steels](#)

B Fu, M Y Lu, W Y Yang, L F Li and Z Y Zhao.....41

[Investigation into Inhibitory Effect of C Incorporation on Diffusion of B in SiGe](#)

J Zhang, J N Wang, G B Chen, Z H Tang, K Z Tan, X Chen and W Cui.....46

[Study on Adsorption Mechanism of Acid-Modified Bentonite](#)

L G Peng, J H Zhu, J Han, X X Wang, M Zhao, H Q Cheng and X Zhang.....53

1.4 Micro / Nano Materials / composites

[Electron Localization States in Asymmetric Shape Carbon Nanotubes Caused by Hydrogen Adsorption](#)

L J Pan and W G Chen.....59

[Numerical Control Device for Preparation Nano-Carbon Granule Coating Superhydrophobic Template and Its Application](#)

G R Shang and Y Li.....65

[Optimized Preparation of Carboxymethyl Chitosan/Sodium Alginate Hemostatic Microcapsule](#)

Z Hu, J Guang, S T Lu, Y Chen, S D Li and Y Cai.....70

[High-temperature Oxidation of Electrodeposited Ni-Co-SiC Composite Coatings](#)

Y Wang, W C Sun, J M Xu, F Guo and Z W Jia.....77

[Structure and Dielectric Properties of \$\(\text{Sr}_{0.2}\text{Ca}_{0.488}\text{Nd}_{0.208}\)\text{TiO}_3\text{-Li}_3\text{NbO}_4\$ Ceramic Composites](#)

C C Xia and G H Chen.....81

[Preparation of ZnO/SnO₂ Composite Nanometer Photocatalyst and Photocatalytic Treatment of Marine Diesel Pollution](#)

J Zhang, X C Yu, Z W Nie, M C Guo, J H Liu and L P Wang.....86

[Transversely Isotropic Hyperelastic Constitutive Model of Short Fiber Reinforced EPDM Based on Tensor Function](#)

Q L Feng, C Li and Y F Liao.....94

[Effect of GNFs/Al Interfacial Characteristics on the Mechanical Properties of Graphene Nanoflakes Reinforced Aluminum Matrix Composites](#)

S Z Zhao, S J Yan, X Chen and S L Dai.....100

[Research on the Ordered Mesoporous Silica for Tobacco Harm Reduction](#)

Y Wang, Z Y Li, J X Ding, Z J Hu, Z Liu, G Zhou and T H Huang.....108

[Numerical Simulations of As-Extruded Mg Matrix Composites Interpenetrated by Metal Reinforcement](#)

H Y Wang, S R Wang, X F Yang and P Li.....113

[Modification of Wood Fiber for Use in Cement Board](#)

F Q Han, X Tan and F Q Zhao.....124

1.5 Testing and Evaluation of Materials

[On-line Monitoring Device for High-voltage Switch Cabinet Partial Discharge Based on Pulse Current Method](#)

S Y Tao, X Z Zhang, H W Cai, P Li, Y Feng, T C Zhang, J Li, W S Wang and X K Zhang.....128

[Exploration on Wire Discharge Machining Added Powder for Metal-Based Diamond Grinding Wheel on Wire EDM Dressing and Truing of Grinding Tungsten Carbide Material](#)

H M Chow, L D Yang, Y C Lin and C L Lin.....136

[Study on Single-yarn Pullout Test of Ballistic Resistant Fabric under Different Preloads](#)

Q C Fang, Z K Lei, F Y Qin, W K Li and R X Bai.....144

[Effect of \$\alpha\$ -Platelet Thickness on the Mechanical Properties of Ti-6Al-4V Alloy with Lamellar Microstructure](#)

Y Ren, S M Zhou, Z Y Xue, W B Luo, Y J Ren and Y J Zhang.....151

[Researches Regarding the Main Chain Vibrations Study of a Shaper](#)

D G Băgnaru, M M Stănescu, C M Mirițoiu, D Bolcu and V Ionică.....160

[Creep Tests and Modeling Based on Continuum Damage Mechanics for T91 and T92 Steels](#)

J P Pan, S H Tu, X W Zhu, L J Tan, B Hu and Q Wang.....168

1.6 New Materials and Advanced Materials

[Experimental Studies on the Synthesis and Performance of Boron-containing High Temperature Resistant Resin Modified by Hydroxylated Tung Oil](#)

J X Zhang, Z Y Ren, G Zheng, H F Wang, L Jiang, Y Fu, W Q Yang and H H He.....172

[High Performance Resistive Switching Characteristics of SiN Films with a Cu/Ta/SiN/Cu/SiN/TiN Multilayer Structure](#)

D Kumar and T Y Tseng.....177

[A Flexible Metamaterial Terahertz Perfect Absorber](#)

X R Chen, Y W Zheng, L M Qin, G C Wei, Z P Qin, N G Zhang, K Liu, S Z Li and S X Wang.....181

1.7 Materials machining

[Machining of Molybdenum by EDM-EP and EDC Processes](#)

K L Wu, H J Chen, H M Lee and J S Lo.....187

[The Effect of High Frequency Pulse on the Discharge Probability in Micro EDM](#)

Y Liu, Y Qu, W Zhang, F Ma, Z Sha, Y Wang, B Rolfe and S Zhang.....195

1.8 Others

[Prediction of Welding Deformation and Residual Stress of Stiffened Plates Based on Experiments](#)

R X Bai, Z F Guo and Z K Lei.....202

[Preparation and Characteristics of Porous Ceramics by a foaming Technology at Low Temperature](#)

H Q Zhang, S P Wang, J Wen, N Wu and S H Xu.....209

[Variation and Grey GM\(1, 1\) Prediction of Melting Peak Temperature of Polypropylene During Ultraviolet Radiation Aging](#)

K Chen, T Y Zhang, F Zhang and Z R Zhang.....214

[Mesoporous Akaganeite of Adjustable Pore Size Synthesized using Mixed Templates](#)

Y Zhang, D L Ge, H P Ren, Y J Fan, L M Wu and Z X Sun.....218

[The Film Forming Mechanism of Chromium-free Passivation in the Tannic Acid System for Electrogalvanized Coating](#)

K Meng, J Rong, X H Yu and Y Wang.....223

[Enhanced Stability of Retained Austenite by Quenching and Double Partitioning Process](#)

Z. R. Hou and X. M. Zhao.....229

[Working Performance Analysis of Rolling Bearings Used in Mining Electric Excavator Crowd Reducer](#)

Y H Zhang, G Hou, G Chen, J F Liang and Y M Zheng.....234

[Research on Treatment Technology and Device of Oily Sludge](#)

J Q Wang, F S Shui and Q F Li.....241

2: Mechanical Engineering

2.1 Laser processing

[Study on Elastoplastic Crack Propagation Behavior of Laser-welded 6061 Aluminum Alloy Using Digital Image Correlation Method](#)

Y Chen, Z K Lei, R X Bai, Y P Wei and W Tao.....248

[Effect of different filler wires on weld formation for fiber laser welding 6A02 Aluminum alloy](#)

F Xu, L Chen, W Lu and E G He.....255

[Deposition of Cubic AlN Films on MgO \(100\) Substrates by Laser Molecular Beam Epitaxy](#)

Z K Mo, W J Yang, Y Weng, Y C Fu, H He and X M Shen.....261

2.2 Thermal Engineering Theory and Applications

[Coefficients of Thermal Expansion for Composites with Agglomerated Carbon Nanotubes](#)

J Pan and L C Bian.....268

[Investigation of the Transverse Spread of Neodymium Ions Implanted in SOI](#)

X F Qin, L Chen and F Y Xu.....274

[Research on the EDM Technology for Micro-holes at Complex Spatial Locations](#)

J Y Liu, J M Guo, D J Sun, Y H Cai, L T Ding and H Jiang.....279

[Large Efficient Intelligent Heating Relay Station System](#)

C Z Wu, X G Wei and M Q Wu.....287

[Thermodynamic Simulation of Viscosity of \$TiO_2\$ - \$Ti_2O_3\$ -CaO Ternary Slag](#)

P Zhang, W H Ma, S J Zhang, Y Lei and J H Wen.....293

[Research on Thermal Topology Design Method of Spindle Based on HCAM](#)

S B Weng, X L Deng, H Lin, J C Wang and C X Xie.....299

2.3 Virtual Manufacturing, and Simulation

[Finite Element Analysis of the Integral Hoisting of 49m Flange Connection Flare](#)

J B Liu.....305

[Research on Modeling Technology of Virtual Robot Based on LabVIEW](#)

Z Wang, J L Huo, L Y Sun and X Y Hao.....311

[Simulation of Ion Energy Distributions in ICP Reactor with Bias Voltages Using COMSOL](#)

C K Han, Y Y Yang, W F Liu, J Cheng, Y J Lu and L H Ji.....318

[Dynamic Simulation Research on Chain Drive Mechanism of Corn Seeder Based on ADAMS](#)

Y B Wang and H P Jia.....325

2.4 Engineering Optimization

[Research on the Optimization Method of Arm Movement in the Assembly Workshop Based on Ergonomics](#)

X M Hu, H W Qu, H J Xu, L Yang and C C Yu.....333

[Analysis of the Identification Principle of Yaw Error of Five-axis Machine Tool Rotary Table in the Virtue Error Sensitive Direction Based on the Machining Test](#)

Y Zhang and L Zhang.....343

[Optimal the Process Variables of Internal Grinding for Shrink Fit Tool Holder](#)

Y C Lin, G H Yang, H M Chow and L T Tsai.....349

2.5 Theory and Application of Friction and Wear

[Working String Axial Force in L-Shaped Oil Well](#)

L S Wang, B K Gao and L Gao.....356

[The B Life Assessment of Auto Chassis Components and Application Based on Weibull Distribution](#)

X F Zhang, Z P Zhang, W Liu and X C Wei.....363

[Comprehensive Deployment Method for Technical Characteristics Base on Multi-failure Modes Correlation Analysis](#)

W Zheng, J M Gao, R X Wang, K Chen and Y Jiang.....370

2.6 Tribology in Manufacturing Processes

[Tribological Behavior of Coating Cr Layer on 40Cr after Surface Electron Beam Pretreatment](#)

J J Hu, J Wang, P Jiang, H B Xu, H Li and T F Hou.....378

[Bio-Tribology Properties of Bionic Carp Scale Morphology on Ti6A14V Surface](#)

W Wang, X Y Wei, K Meng, L H Zhong, Y Wang and X H Yu.....384

2.7 Others

[Iris Location Algorithm Based on the CANNY Operator and Gradient Hough Transform](#)

L H Zhong, K Meng, Y Wang, Z Q Dai and S Li.....390

[Statistical Analysis and Prediction on Tensile Strength of 316L-SS Joints at High Temperature Based on Weibull Distribution](#)

Z L An, T Chen, D L Cheng, T H Chen and Z Y Wang.....397

[Development of the Noise-Resistant and Sound Focusing Accessory of Ultrasonic Leak Detector for Spacecraft on Orbit](#)

W Sun, R X Yan, L C Sun and R P Shao.....403

[Capturing Revolute Motion and Revolute Joint Parameters with Optical Tracking](#)

C Antonya.....410