# 7th Global Conference on Materials Science and Engineering (CMSE 2018)

IOP Conference Series: Materials Science and Engineering Volume 474

Xi'an, China 1 - 4 November 2018

**Editor:** 

**Alexander Khotsianovsky** 

ISBN: 978-1-5108-8117-4 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.

This work is licensed under a Creative Commons Attribution 3.0 International Licence. Licence details: http://creativecommons.org/licenses/by/3.0/.

Printed by Curran Associates, Inc. (2019)

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 7481Fax: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 474

The 7th Global Conference on Materials Science and Engineering

1-4 November 2018, Xi'an, China

Accepted papers received: 19 December 2018 Published online: 13 February 2019

Preface

Preface

Peer review statement

### Papers

Preparation of tin oxide/graphene composite for lithium-ion batteries' application

H L Cao, X Jiang, B J Song and Y C Shi....1

Strain-controlled fatigue testing of TRIP800 high-strength quenching and partitioning steel

Q Y Jiang.....7

Reduction of stress concentration by polymer flexible joints in seismic protection of masonry infill walls in RC frames

A. Kwiecień.....12

A generalized saturated capacitor model for hysteresis in piezoelectric materials

Y Liu, M Huo and M Tang.....19

Stable and environment-hard vacuum nanoelectronic devices for aerospace applications

M Nakamoto and J Moon.....27

Hydraulic system elaboration and simulation for single-drive light-load monorail locomotive in fully mechanized coal mining applications

Z A Song and F Jiang.....39

Layup structure effect on the composite laminate impact resistance: experimental and finite element studies

M Gong, S G Sun, L T Teng and Q S Tu.....47

Design optimization and experimental study of coaxial powder-feeding nozzle in the laser cladding process

H Ju, Z J Zhang, C X Lin, Z J Liu and H L Jiang.....57

Dynamical Casimir effect meets material science

V V Dodonov.....65

Structural analysis of hydrogenated diamond-like carbon coatings prepared using magnetron sputtering

Y L Su, S H Yao, Y H Mao and Z L You.....72

On using photoconductivity decay to determine Si free carrier recombination lifetime: possibilities and challenges

I M Anfimov, M V Anfimov, D S Egorov, S P Kobeleva, K V Pushkov, I V Schemerov and S Yu Yurchuk.....79

Effect of tool/material interface temperature on flow stress and the Zener-Holloman parameter in Al 6082 friction stir butt welds

M Krishna Kishore, A Kumar and N Ch Kaushik.....86

Effects of microfiller on the rheological behavior and structure of SBS modified bitumen

L M Zhou, T Xia, J H Xu, Y P Qin, W Q Chen and J F Dai.....94

Automatic device elaboration for grouting bag setting under free spanning of submarine pipelines

B Zhang, Z Wang and T Wang.....102

Mechanical test and buckling analysis of X-type grouted clamps for the offshore platform structures

Z Wang, B Zhang and T Wang.....110

The refinement of dynamic deformation equation for AISI1215 steel using the Zener-Hollomon parameter

C L Pu, S N Fang, H Wang, Y Lu, J G Sun and F Gui.....117

Analysis of corrosion and scaling in high-voltage direct-current valve cooling water system

X W Li, D Ding, L Wang and L W Sun....125

Effect of freezing and thawing cycle properties of cement-stabilized macadam materials with self-prepared early-strength agents

M Lin, Y C Guo, B S Tian and Y L Song.....136

General expression of pressure angle and principal curvature of globoidal indexing cam mechanism

J Li, X Rao, M Tang and Y J Li....144

Effect of cooling process on mechanical properties of thin-gauge hot-rolled dual-phase steel

B Liu, R Wu and J Hu....154

Pressure-induced new spin-states in Ni-25at%Mn mechanical alloy under high pressure

N Q Sun, R Zach and F Ono.....160

<u>Comparison of SnO<sub>2</sub>-carbon nanotubes composite and the SnO<sub>2</sub>-carbon black mixture as an anode for Li-ion batteries</u>

G Q Diao, H Li, I Ivanenko, T Dontsova, I Astrelin, F Y Xie and X Z Guo.....168

Characterization of the actuating response of the graphene oxide/MEO<sub>2</sub>MA hydrogel layer

H-Y Hsiao, N A M Razali and W-C Lin....174

Recent research progress on CALPHAD-based ICME modeling of magnesium alloys

S S Song.....181

The behavior of laced built-up columns made of aluminum alloy

I J Baláž and Y P Koleková.....188

Damage investigation of pre-stressed cables in segmental box girder concrete bridge ev. No. 324-018 in Pardubice, Czech Republic

S Rehacek, D Citek, P Bouska and J Kolisko.....194

Pavement performance of environmentally friendly asphalt modifier in hot and humid environment

J Zhang, K Zhu, G Qiu, Z Yang and Y Zhang.....201

Phase structure and fracture toughness of the polyethersulfone-modified bismaleimide resin

X G Li, W Q Mu, Y T Li, H H Qian, L J Cheng and J L Liu.....212

Electric and elastic singularity eigenanalysis of the V-notch in a piezoelectric Reissner plate

C Z Cheng, H L Dou, Z Y Gao, SL Yao, D P Wang and Z R Niu.....219

An experimental study on thermal contact conductance across the SS316L/CuCrZr interface

X B Liang, J Y Yao, W F Zhang, N Li, M Y Ma and Y R Wang.....226

<u>Structural design and simulation analysis of the carbon fiber-reinforced polymer main</u> <u>frame of a mapping camera system</u>

Q L Wang, W Z Wang, Q X Wang, H J Jiang, X H Zhou and L Zhang.....232

Experimental study on repairing of damaged cast iron cylinder heads by 3D printing arc welding system

H Y Wang, C Y Li, Y M Ding, J Li and S C Chen.....240

Calculation and analysis of nonlinear dynamic model based on the characteristic line method

J Li, B A Jiang, Q L Ning and S Xue.....245

Optimizing of hardness, microstructure and adhesive strength of plasma-sprayed FeSiAl coatings using orthogonal analysis

Y Guo, X Q Feng, S L Jiang, X Jian, L Zhang, X Wang and L J Deng.....253

The effect of Sn-Al-C composite powders on the electromagnetic interference shielding of capsule building materials

F S Hung.....259

Study on the Mg-Zn binary alloys fabricated by gas-phase alloying

Y T Yan, L B Niu, Y X Long and J Ma.....267

Study on mechanical properties of FGD matrix composites

T W Liu, Z Wang, G Z Li, G P Shi and X Zhao.....273

Mechanical properties and thermal conductivity of lightweight thermal insulation composites

T W Liu, Z Wang, G Z Li, G P Shi and X Zhao.....279

Water resistance of flue gas desulphurization gypsum-fly ash-steel slag composites

T W Liu, Z Wang, G Z Li, G P Shi and X Zhao.....285

Effects and mechanisms of slag reinforced coal gangue geopolymers

H Q Ma, H G Zhu, H Y Chen, Y D Ni, T Wang and S Yang.....291

Effect of pre-annealing heat treatment on destabilization behavior of 28 wt. % Cr-2.6 wt. % C high-chromium cast iron

A Wiengmoon, J Khantee, J T H Pearce and T Chairuangsri.....298

Experimental study on the utilization of waste foundry sand as embankment and structural fill

M F Iqbal, Q F Liu and I Azim.....304

A novel approach to assessing the anisotropic permeability parameters of fractured media

X Y Song, Y T Liu, X E Jiang, Z P Ding and L Xue.....312

Testing of glutathione contents by calcein-Cu(II) fluorescence spectra

L Liu, W Wu, Y Zhang, W Chen, J Y Guo and S Z Li.....322

Characterization of hot deformation behavior of TC32 titanium alloy

J Li, L W Zhu, M B Li, X N Wang, G Q Shang and Z S Zhu.....329

The safety thickness of blast furnace hearth lining and simulation analysis for different interventions

J F Chen, L Y Chen and Y Li.....335

The durability of reactive powder concrete: a review

S G Liu, Z Xiang, R H Huang, D H Wang and Y Z Ju.....341

Oxidation resistance improvement of ZrB2 powders by the deposition of  $Al_2O_3/Y_2O_3/ZrO_2$  coatings via chemical coprecipitation method

X Q Feng, X Wang, Y Liu, Y Guo, M Zhang, L Zhang, J L Xie and L J Deng.....346

Synthesis of α-cordierite based glass-ceramic from Bayan Obo tailing and fly ash through volume crystallization

B W Li, Z Y Zhang, W L Wu, M Zhao and Y Shi.....354

Simulation analysis the effect of heat sink fins on the high-power LED

D S Peng, K L Liu, M X Zhang and C C Tan.....360

Simulation of dental resin monomer mixtures

S B Hong, H B Liu, L Wang, X Zhang, G Chen, H X Liu, S Y Huang and B Li.....366

Preparation of submicron boron carbide at a high heating rate

J Zhao, W H Zhou and S L Hu.....372

Study on fracture behavior of NiTi Alloy by the digital image correlation method

L Y Ma, Y J Li and G Han.....380

Study on innovative modified silicate composite grounding electrode

R Liu, Z G Fang, X H Wang and Z Zhang.....387

Improved LayerWise Theory method application to stress analysis for composite tube in pure bending

C Zhang and R Chang.....394

The composite curing deformation prediction with the account of mold factors

C L Guan, J L He, X B Yang, J Dai and J Zhang.....401

The morphology-controlled deposition of ZnO nanocrystalline

D Zhou, L N Wang, J T Liu, Y Yu, Z Q Luan, Z H Gao, G Y Jin, Y T Chen and W Z Huang.....409

Fatigue life prediction of flexible bearings based on ABAQUS and nCode-DesignLife

D S Zhao, Y Z Wang and K Zhao.....414

<u>Study on engaging characteristics of wet friction pair with copper-based powder</u> <u>metallurgical friction material</u>

Y Z Wang, S Y Ren, Y Li, W Zhang and X M Chu.....421

Chitosan blend iron oxide nanostructure-based biosensor for healthy & malignant tissue glucose/urea detection

M W Akram, M F Alam, H N Ji, A Mahmood, Tariq Munir, M Z Iqbal, M R Saleem, N. Amin and A G Wu.....428

Effect of austenitizing temperature on microstructure formation of quenched X65 microalloyed pipeline steel

Z X Qiao, H X Mi, J Huo, Y B Wan and X Chen.....434

<u>3D processing maps and a modified constitutive model of 16Cr-5Ni-Mo supermartensitic</u> <u>stainless steel</u>

Y W Sun, Y P Zhong, L S Wang and F X Fan.....440