

# **7th International Conference on Key Engineering Materials (ICKEM 2017)**

IOP Conference Series: Materials Science and Engineering  
Volume 201

Penang, Malaysia  
11 – 13 March 2017

ISBN: 978-1-5108-4175-8  
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. (2017)

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](mailto: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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# Table of contents

## Volume 201

**7th International Conference on Key Engineering Materials (ICKEM 2017)  
11–13 March 2017, Penang, Malaysia**

**Accepted papers received: 10 May 2017  
Published online: 2 June 2017**

### **Preface**

011001

OPEN ACCESS

[7th International Conference on Key Engineering Materials \(ICKEM 2017\)](#)

011002

OPEN ACCESS

[Peer review statement](#)

### **Design and test of composite structure**

012001

OPEN ACCESS

[Study of stinging nettle \(\*urtica dioica\* l.\) Fibers reinforced green composite materials : a review](#)

I G P Agus Suryawan, N P G Suardana, I N Suprpta Winaya, I W Budiarsa Suyasa and T G Tirta Nindhia.....1

012002

OPEN ACCESS

[A study on biocomposite from local balinese areca catechu l. husk fibers as reinforced material](#)

C I P K Kencanawati, N P G Suardana, I K G Sugita and I W B Suyasa.....8

012003

OPEN ACCESS

[Mechanical properties and water sorption of geothermal silica/thermoset composites](#)

D E O Santiago and B B Pajarito.....13

012004

OPEN ACCESS

[Effect of degrading yellow oxo-biodegradable low-density polyethylene films to water quality](#)

B A Requejo and B B Pajarito.....18

012005

OPEN ACCESS

[Effect of type and loading of surface-modifying agent on mechanical properties of modified geothermal scale powder/stereolithography polymer composite](#)

A. C. Tilendo and B. B. Pajarito.....24

012006

OPEN ACCESS

[Development of porous structured polyvinyl alcohol/zeolite/carbon composites as adsorbent](#)

J A Laksmono, M Sudibandriyo, A H Saputra and A Haryono.....30

012007

OPEN ACCESS

[Antimicrobial and water-triggered release characteristics of a copper sulfate-polyvinyl acetate adhesive composite](#)

A. P. O. De Jesus, R. M. L Roxas-Villanueva and M. U. Herrera.....35

012008

OPEN ACCESS

[Electrically conductive carbon fibre-reinforced composite for aircraft lightning strike protection](#)

Andrzej Katunin, Katarzyna Krukiewicz, Roman Turczyn, Przemysław Sul and Marcin Bilewicz.....40

012009

OPEN ACCESS

[Study of the mechanical properties of hybrid composite basalt / alumina / shells for brake lining pads](#)

I K. Adi Atmika, IDG. Ary Subagia, I W. Surata and I N. Sutantra.....45

## **Performance optimization and evaluation of building materials**

012010

OPEN ACCESS

[Synthesization and characterization of poly\(lactic-co-glycolic acid\) / calcium phosphate bone cement from crab shells](#)

M R Abdul Hanan, N M Daud, L H Ismail and S Saidin.....50

012011

OPEN ACCESS

[Effect of Mineral Filler type on Strength of Roller Compacted Rubbercrete for Pavement Applications](#)

Musa Adamu, Bashar S Mohammed and Nasir Shafiq.....55

012012

OPEN ACCESS

[Rheological and rutting evaluation of composite nanosilica/polyethylene modified bitumen](#)

Nura Bala, Ibrahim Kamaruddin, Madzlan Napiah and Nasiru Danlami.....60

012013

OPEN ACCESS

[Optimisation of nano-silica modified self-compacting high-Volume fly ash mortar](#)

Bitrus Emmanuel Achara, Bashar S. Mohammed and Muhd Fadhil Nuruddin.....66

012014

OPEN ACCESS

[Formulation of geopolymer cement using mixture of slag and class f fly ash for oil well cementing](#)

Dinesh Kanesan, Syahrir Ridha and Prasath Rao.....73

## **Simulation of mechanical properties of materials**

012015

OPEN ACCESS

[Design and manufacture a coconut milk squeezer](#)

I Wayan Surata, Tjokorda Gde Tirta Nindhia, D. Budyanto and A. E. Yulianto.....77

012016

OPEN ACCESS

[Simulation and Characterisation of Planar Spring Based on PCB-FR4 in Electromechanical System for Energy Harvesting](#)

A N Fuadah, N F Maulanisa, A Ismardi and G Sugandi.....82

012017

OPEN ACCESS

[Validation of Finite Element Model used to Analyze Sheet Metal Punching Process in Automotive Part Manufacturing](#)

N Chantarapanich, A Siripanya, S Sucharitpwatskul and S Wanchat.....87

012018

OPEN ACCESS

[Analysis of flexible layered shallow shells on elastic foundation](#)

L Stupishin, A Kolesnikov and T Tolmacheva.....92

012019

OPEN ACCESS

[Numerical research orthotropic geometrically nonlinear shell stability using the mixed finite element method](#)

L Stupishin, K Nikitin and A Kolesnikov.....97

012020

OPEN ACCESS

[Comparative analysis of buckling criteria for engineering structures. Single-degree-of-freedom systems](#)

L. Stupishin.....102

012021

OPEN ACCESS

[The Stability of Lubricant Oil Acidity of Biogas Fuelled Engine due to Biogas Desulfurization](#)

Tjokorda Gde Tirta Nindhia, I Wayan Surata and Ari Wardana.....107

### **Analysis of chemical properties of materials**

012022

OPEN ACCESS

[Creation of hydrophobic surfaces using a paint containing functionalized oxide particles](#)

Paul Albert L. Sino, Marvin U. Herrera and Mary Donnabelle L. Balela.....112

012023

OPEN ACCESS

[Experimental analysis of high oxygen concentration influences on horizontal flame spread over PA6 and epoxy](#)

Ruichao Wei, Richard Yuen and Jian Wang.....117

012024

OPEN ACCESS

[Effect of Substrate Orientation on the Growth of Germanium Oxide in Dry Oxygen Ambience](#)

SK Sahari, NA Abdul Halim, K Muhammad, M Sawawi, AA Hamzah and B Yeop Majlis.....122

012025

OPEN ACCESS

[Electrical characteristics of zinc oxide-copper oxide heterojunction at different illumination intensities](#)

Teresa Lean Baquiran, Maria Carmela T. Garcia and Marvin U. Herrera.....127

012026

OPEN ACCESS

[Copper laminated composites reinforced with Al<sub>2</sub>O<sub>3</sub> nanoparticles by suspension method and hot pressing](#)

G. Roudini, A.Rasti Ghahfarokhi and A. Behzadmehr.....132

012027

OPEN ACCESS

[Influence of stack effect on the heat feedback to the n-heptane pool fires](#)

Xiangyong Yuan, Zihé Gao, Jie Ji, Lizhong Yang and Jinhua Sun.....137

012028

OPEN ACCESS

[Effect of replacing carbon black with surfactant-modified silica clay on mechanical properties of natural rubber composites](#)

N J Pinton and B Pajarito.....142

012029

OPEN ACCESS

[Investigation of the electrical performance of hfo<sub>2</sub> dielectrics deposited on passivated germanium substrates](#)

Q Lu, Y Mu, Y Zhao, C Z Zhao, S Taylor and P R Chalker.....148

012030

OPEN ACCESS

[Formation of Ni\(OH\)<sub>2</sub> hybrid structures on Carbon Cloth](#)

L A Dahonog, J D Ocon and M D L Balela.....153



012031

OPEN ACCESS

[The use of macroalgae \(\*Gracilaria changii\*\) as bio-adsorbent for Copper \(II\) removal](#)

Lavana-Baloo, Nordin Idayu, Ibrahim Umar Salihi and Jamari Zainoddin.....158

012032

OPEN ACCESS

[Characteristics of Ampel bamboo as a biomass energy source potential in Bali](#)

M. Sucipta, D. N. K. Putra Negara, T. G. Tirta Nindhia and I W. Surata.....168

012033

OPEN ACCESS

[Chemical, strength and microstructure characterization of Balinese bamboos as activated carbon source for adsorbed natural gas application](#)

D N K Putra Negara, T G Tirta Nindhia, I W Surata and M Sucipta.....173

012034

OPEN ACCESS

[Adsorption of Lead ions onto Activated Carbon derived from Sugarcane bagasse](#)

I. U Salihi, S.R.M Kutty and M. H Isa.....179

## **Material performance analysis and test**

012035

OPEN ACCESS

[Effect of volume fraction of alpha and transformed beta on the high cycle fatigue properties of bimodal Ti6Al4V alloy](#)

Shital Jadhav, Amit Powar, Sandip Patil, Ashish Supare, Bhagwan Farane and Dr. Rajkumar Singh.....186

012036

OPEN ACCESS

[Correlation analysis of heat flux and fire behaviour and hazards of polycrystalline silicon photovoltaic panels](#)

Xiaoyu Ju, Xiaodong Zhou, Fei Peng, Zhibo Wu, Dimeng Lai, Yue Hu and Lizhong Yang.....192

012037

OPEN ACCESS

[Life prediction of I6 steel using strain-life curve and cyclic stress-strain curve by means of low cycle fatigue testing](#)

Sanket Inamdar, Manoj Ukhande, Prashant Date, Dattaprasad Lomate, Shyam Takale and RKP Singh.....199

012038

OPEN ACCESS

[Embedding of copper sulfate and copper oxide on multipurpose paper](#)

D L V Almanza, J L A de Luna and M U Herrera.....206

012039

OPEN ACCESS

[Crack resistance of glued laminated timber after operational effects](#)

L. Stupishin, V. Kabanov and A. Masalov.....211

012040

OPEN ACCESS

[Ti/IrO<sub>2</sub>/SnO<sub>2</sub> anode for electrochemical degradation of chlorpyrifos in water: optimization and degradation performances](#)

G C Pathiraja, M S Wijesingha and N Nanayakkara.....216

012041

OPEN ACCESS

[Embedding of polyaniline molecules on adhesive tape using successive ionic layer adsorption and reaction \(SILAR\) technique](#)

J. K. Pamatmat, A. V. Gillado and M. U. Herrera.....223

012042

OPEN ACCESS

[Fabrication of polyaniline-coated Kapok \(\*Ceiba pentandra\*\) fibers embedded with copper-based particles](#)

K. E. Arguelles, M. U. Herrera, C. C. M. Futralan and M. D. L. Balela.....228

012043

OPEN ACCESS

[Carbon monoxide gas sensing using zinc oxide deposited by successive ionic layer adhesion and reaction](#)

E. A. Florido and N. A. C. Dagaas.....233

012044

OPEN ACCESS

[Effect of cryogenic temperatures on the failure strain and surface morphology of glass fiber](#)

Qingwei Wang, Chen Jian, Luo Lida and Ning Wei.....238

012045

OPEN ACCESS

[Effect of Al on the mechanical properties and corrosion resistance of Pb-Al alloy](#)

Zhicheng LU, Zhenlin LIU, Yongliang LI, Dan WU and Fuming WANG.....243

012046

OPEN ACCESS

[Effects of hydrogen on microstructure and hot deformability of directionally solidified Ti-44Al-6Nb-1Cr alloy](#)

T. F. Ma, R. R. Chen, J. J. Guo, H. S. Ding, Y. Q. Su and H. Z. Fu.....250

012047

OPEN ACCESS

[Microstructural evolution of two binary  \$\beta\$ -titanium alloys during cold deformation](#)

Saad Mohamed Ebied, Mohamed Abdel-Hady Gepreel and Atef Hamada.....255

012048

OPEN ACCESS

[Fabrication of zinc oxide-embedded kapok \(\*Ceiba pentandra\*\) paper](#)

E S Mones, M D L Balela, C C M Futralan, R D Manalo and M U Herrera.....262

012049

OPEN ACCESS

[Antibacterial activity of copper-based particles synthesized using an electroless deposition technique](#)

M. J. G. Biguerras, M. U. Herrera, C. C. Futralan and M. D. L. Balela.....267

012050

OPEN ACCESS

[Facile synthesis of cupric hydroxide and cupric oxide on copper foil for potential electrochemical applications](#)

E M A Espejo and M D L Balela.....272

012051

OPEN ACCESS

[Carbon monoxide gas sensing using zinc oxide film deposited by spray pyrolysis](#)

J. M. G. Leano, J. M. L. A. Villapando, A. E. Balaaldia, G. Gianan, F. K. B. Manalo and E. A. Florido.....277