

# **International Conference on Materials Research and Innovation (ICMARI 2018)**

IOP Conference Series: Materials Science and Engineering  
Volume 526

Bangkok, Thailand  
17 - 21 December 2018

## **Editors:**

**Wirasak Smitthipong  
Saree Phongphanphanee  
Jirasak Wong-ekkabut**

ISBN: 978-1-5108-9808-0  
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/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission 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 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 526

**The International Conference on Materials Research and Innovation**

**17–21 December 2018, Bangkok, Thailand**

**Accepted papers received: 3 April 2019**

**Published online: 8 August 2019**

### **Preface**

[The International Conference on Materials Research and Innovation](#)

[The International Conference on Materials Research and Innovation](#)

[Peer review statement](#)

### **Papers**

[Effect of tackifier resin and non-rubber components on adhesive property of natural latex](#)

T Prasopdee, K Sriroth and W Smitthipong.....1

[FEM-based assessment of wear of stamping die](#)

T Trzepiecinski and H G Lemu.....5

[Development of rapid qualitative detection DNA microarray platform for \*Salmonella typhimurium\* for food safety](#)

C Samphaongern, C Pipatpanukul and T Srihirin.....9

[Business Process Analysis and Improvement for a Third Party Logistics Provider in Indonesian Cold Chain Logistics](#)

S P Pradita and P Ongkunaruk.....13

[Self-Assembly of Aldehyde Lipids in Water](#)

M Janlad, P Boonnoy and J Wong-ekkabut.....17

[Monte Carlo simulations of nanorod filler in composite polymer material](#)

N Kerdkaen, T Sutthibutpong, S Phongphanphanee, S Boonchui and J Wong-ekkabut.....21

[Bond strength of laminated films between poly\(lactic acid\) based cast films and metalized cast polypropylene films](#)

N Hongsriphan, J Chaichana, C Pornpitakdamrong and S Thaptham.....25

[Effect of Acetic Acid Pre-Treatment on the Growth Temperature of Graphene on Copper by Thermal Chemical Vapor Deposition](#)

P Kokmat, N Donnuea, N Nuntawong, A Wisitsoraat and A Ruammaitree.....29

[Conductive paper of reduced graphene oxide and nanofibrillated cellulose](#)

S Tanpichai, M Aachri, P Pattananuwat and P Potiyaraj.....33

[Material Ratio Analysis of Charcoal Briquettes from Dendrocalamus Asper Backer Bamboo](#)

R Lukmuang, C Dasaard, P Chantawong and D Ngamrunroj.....37

[Adhesion and heat build-up of rubber for energy-saved tyre](#)

S Suethao and W Smitthipong.....41

[Study of the effect of electron beam on thermal and mechanical properties of poly\(lactic acid\)/poly\(butylene succinate\) blends](#)

S Tiptipakorn, K Hemvichain and A Pirombua.....45

[Comparative neutron-shielding properties of metal oxide/HDPE composites using a Monte Carlo Code of PHITS](#)

W Poltabtim, D Toyen and K Saenboonruang.....49

[Effects of Bromide-mixing in Methylammonium Lead Iodide on Photovoltaic Properties of ZnO-based Perovskite Solar Cells](#)

C Khaywimut, C Bhoomanee, S Choopun, D Wongratanaphisan, A Pengpad and P Ruankham.....53

[Manufacturing process and properties of lead-free natural rubber sponge for use in X-ray and gamma ray shielding applications](#)

P Lim-aroon, E Wimolmala, N Sombatsompop and K Saenboonruang.....57

[Electrical interaction between nanoparticle and surface of material](#)

C. Summueang and S. Boonchui.....61

[Chirality Effects on an Electron Transport in Single-walled Carbon Nanotube Coupling to a Quantum Dot](#)

S Boonchui and J Charoenpakdee.....65

[Effects of Sn Incorporation in ZnO Thin Films on Properties of Perovskite Solar Cells](#)

P Malison, C Bhoomanee, S Choopun, D Wongratanaphisan, T Sagawa and P Ruankham.....69

[Extraction of nanocellulose from pineapple leaves by acid-hydrolysis and pressurized acid hydrolysis for reinforcement in natural rubber composites](#)

W Chawalitsakunchai, P Dittanet, S Loykulnunt, S Tanpichai and P Prapainainar.....73

[Reduction of Endotoxin from Human Root Canals by Calcium Hydroxide Nanoparticles](#)

P Lungkapinth and P Louwakul.....77

[Potential Application of Biopolymer Chitosan and Cationic/Anionic Polymers in Textile Wastewater Treatment](#)

W Watcharin and S Wiratthikowit.....81

[Synthesis of sodium lignosulfonate from lignin extracted from oil palm empty fruit bunches by acid/alkaline treatment for reinforcement in natural rubber composites](#)

N Thungphotrakul, P Dittanet, S Loykulnunt, S Tanpichai and P Parpainainar.....85

[Facile preparation of a magnetic carbon adsorbent via simultaneous magnetization and activation of sugarcane bagasse and Fe<sup>2+</sup> and Fe<sup>3+</sup> ions](#)

S Mahawong, A Saning, W Watcharin, D Dechtrirat and L Chuenchom.....89

[Effect of molecular weight of poly\(L-lactic acid\) on the stereocomplex formation between enantiomeric poly\(lactic acid\)s blendings](#)

Y Srithep, D Pholharn and T Akkaprasa.....93

[Biodegradation of Levan Polymer / Poly \(Lactic Acid\) \(PLA\) Blend](#)

P Phengnoi, K Thongmee, S Tiptipakorn, B Boekfa and K Kuttiyawong.....97

[Optimization of poly\(L-lactide\)-polybutylene adipate terephthalate diblockcopolymer by ring opening polymerization](#)

D Pholharn and Y Srithep.....101

[Efficacy of cold atmospheric pressure plasma jet against \*Enterococcus faecalis\* in apical canal of human single-rooted teeth: a preliminary study](#)

K Saleewong, P Wanachantararak and P Louwakul.....105

[Numerical Investigations on the Effect of Gas Flow Rate in the Gas Stirred Ladle with Dual Plugs](#)

S Lakkum and P Kowitwarangkul.....109

[Synthesis of Na-A zeolite from water treatment residue using hydrothermal and microwave techniques](#)

B Theptham and S Asavapisit.....113

[Thermal and Melting track Simulations of Laser Powder Bed Fusion \(L-PBF\)](#)

P Ninpetch, P Kowitwarangkul, S Mahathanabodee, R Tongstri and P Ratanadecho.....117

[Vinyl Cis Rubber superior polymer for future trends](#)

T Puvanatvattana and T Chansorn.....121

[Solvated lithium ions in defective Prussian blue](#)

N Ruankaew, N Yoshida and S Phongphananee.....125

[Evaluation of silver -copper-tin brazing alloy corrosion behavior in chloride containing electrolyte at various temperature](#)

A Nurrochman, E Prajateljista and K Cho.....129

[The Performance of Permanent Magnet Core of Reducing Sag Voltage in Personal Computer \(PC\)](#)

H Ys and A D Simanjuntak.....133

[Development of tyre tread compounds for good wet-grip : effects of rubber type](#)

K Suchiva, C Sirisinha, P Sae-oui and P Thapthong.....137

[Carbon sequestration potential of rubber-tree plantation in Thailand](#)

D Satakhun, C Chayawat, J Sathornkich, J Phattaralerphong, P Chantuma, P Thaler, F Gay, Y Nouvellon and P. Kasemsap.....141

[Peptidomic and Bioinformatic Analysis to Evaluate the Application of Peptides from Latex of \*Hevea brasiliensis\* Clone BPM24](#)

P Havanapan and N Phungthanom.....145

[Properties of natural rubber \(NR\) and wood/NR composites as gamma shielding materials](#)

K Ninyong, E Wimolmala, N Sombatsompop and K Saenboonruang.....149

[Impact strength enhanced bioplastic polylactic acid by interfacial bonding with hydroxylated natural rubber](#)

P Boochathum, W Mingwanish and S Pivsa-Art.....153

[Formulating policy recommendations for potential rubber plantation owners and rubber wood consumers in Thailand to obtain international forest management certification](#)

K Duangsathaporn, P Prasomsin, N Laemsak, Y Omule, K Palakit and P Lumyai.....157

[Research to Develop International Standards for Rubber Household Glove and Rubber Thread](#)

S Wirasate, O Pinprayoon, P Sunintaboon and C Nimsuwan.....163

[Innovative Design of Latex Gloves Production Lines via Modular Industrial-sized Prototypes](#)

P Yongyingsakthavorn, T Chantrasmi, T Sriyubol, P Nimdum, A Tohsan and U Nontakaew.....166

[A game-theoretic model to select suitable rubber policy](#)

N Paoprasert, T Varasirikul and J Pichitlamken.....170

[Identification of bacteria caused bad odors in the rubber plants](#)

K Choowongkomon, S Pumloifa, N Hansupalak and W Insuan.....174



[Surface treatment with microwave plasma improving PEDOT:PSS adhesion on natural rubber](#)

K Meesawat, K Thana, R Jaisutti and N Petchsang.....178