

# **2nd International Symposium on Frontier of Applied Physics (ISFAP 2016)**

Journal of Physics: Conference Series Volume 817

Jakarta, Indonesia  
3 – 5 October 2016

**Editors:**

**Febty Febriani**

ISBN: 978-1-5108-3902-1  
ISSN: 1742-6588

**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© (2016) 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 817

**2nd International Symposium on Frontier of Applied Physics (ISFAP 2016)**  
**3–5 October 2016, Jakarta, Indonesia**

**Accepted papers received: 28 February 2017**  
**Published online: 7 April 2017**

### **Preface**

011001  
OPEN ACCESS  
[2nd International Symposium on Frontier of Applied Physics \(ISFAP 2016\)](#)

011002  
OPEN ACCESS  
[Editorial Board](#)

011003  
OPEN ACCESS  
[Peer review statement](#)

### **Papers**

**Advanced Materials, Materials for Energy and Nanotechnology (AM)**

012001  
OPEN ACCESS  
[Synthesis and characterization of 8YSZ/5GDC composite and dissimilar-bulk by sonochemistry assisted sol-gel method](#)

A K Rivai, N Shabrina and A R Setiawan.....1

012002

OPEN ACCESS

[Enhancement of microwave absorption properties on modified kapton film by ion implantation process](#)

S Purwanto, W A Adi and Y Taryana.....7

012003

OPEN ACCESS

[CNT coated thread micro-electro-mechanical system for finger proprioception sensing](#)

A A Shafi and D H B Wicaksono.....13

012004

OPEN ACCESS

[Electrophoretic deposition of zinc oxide on graphite drawn on paper](#)

C S Sebastian, M U Herrera and A K G Tapia.....19

012005

OPEN ACCESS

[Electrochemical performance of natural graphite coated by amorphous carbon using two step synthesis processes at various temperatures for anode material in Li-ion battery](#)

F Rohman, S M Nikmah and J Triwibowo.....25

012006

OPEN ACCESS

[Production of activated carbon by using pyrolysis process in an ammonia atmosphere](#)

N Indayaningsih, F Destyorini, R I Purawardi, D R Insiyanda and H Widodo.....31

012007

OPEN ACCESS

[The role of Mg dopant on the morphological, structural and optical properties of Mg doped zinc oxide grown through hydrothermal method](#)

P Susetyo, V Fauzia and I Sugihartono.....37

012008

OPEN ACCESS

[Analysis of effective pulse current charging method for lithium ion battery](#)

N Majid, S Hafiz, S Arianto, R Y Yuono, E T Astuti and B Prihandoko.....43

012009

OPEN ACCESS

[The effect of nitric acid and Hexadecyltrimethylammonium Bromide \(CTAB\) concentration on the morphology and plasmonic properties of gold nanorods](#)

V Fauzia and H E Permana.....49

012010

OPEN ACCESS

[Performance of gas diffusion layer from coconut waste for proton exchange membrane fuel cell](#)

H Widodo, F Destyorini, D R Insiyanda and A Subhan.....55

012011

OPEN ACCESS

[Analytical electron microscopy study of new class material  \$\text{Cr}\_2\text{AlC}\$  for coating applications at high temperature environments](#)

R Iskandar.....60

012012

OPEN ACCESS

[Mechanical properties, microstructure, and biocompatibility of Ti-6Al-6Nb](#)

G Senopati, C Sutowo and M I Amal.....66

012013

OPEN ACCESS

[Polyvinilidene fluoride \(PVDF\) nanofiber membrane for Li-ion rechargeable battery separator](#)

H Widiyandari, A Purwanto and S A Widyanto.....71

012014

OPEN ACCESS

[The effect of Cu dopant on morphological, structural and optical properties of ZnO nanorods grown on indium tin oxide substrate](#)

J Marselie, V Fauzia and I Sugihartono.....77

012015

OPEN ACCESS

[Electrical properties of Al-, Cu-, Zn- rice husk charcoal junctions](#)

L A Dahonog and A K G Tapia.....83

012016

OPEN ACCESS

[Effect of coating thickness of Al-doped  \$\text{Li}\_4\text{Ti}\_5\text{O}\_{12}\$  \(LTO\) on the electrochemical performance of half cell battery](#)

S Priyono, G F Marpaung, T R Simbolon and A Subhan.....89

012017

OPEN ACCESS

[Pi-pi\\* orbital transitions and photo-degeneracy of \*C.acuminata\* sensitized solar cells](#)

T Abodunrin, A Boyo, M Usikalu, L Obafemi, O Oladapo, L Kotsedi, Z Yenus and M Maaza.....95

012018

OPEN ACCESS

[Surface modification of ZSM-5 zeolite: effect of cation on selective conversion of biomass-derived oil](#)

W B Widayatno.....101

012019

OPEN ACCESS

[Improved properties of LiBOB-based solid polymer electrolyte by additive incorporation](#)

C Ratri, Q Sabrina, T Lestariningsih and E Wigayati.....108

012020

OPEN ACCESS

[Activation energy determination in multi-frequency dynamic molecular interaction analysis of PEG 4000-Cristobalite composites using DMA](#)

N A Fauziyah, T A Fadly, A Rosyidi, Mashuri and S Pratapa.....113

012021

OPEN ACCESS

[Controlled crystal phase of TiO<sub>2</sub> by spray pyrolysis method](#)

B B Aji, S J Shih and T Pradita.....118

012022

OPEN ACCESS

[Investigation on the path process of M doped ZnO \(M = Gd, Mg\) via the sol-gel method from dried gel to stable nanostructure powder](#)

Suharno, B Soegijono, S Budiawanti and L Fadillah.....124

012023

OPEN ACCESS

[The effect of thermal and organic additive in morphology of ceramic based silicate](#)

J Ginting, N Bangun, H Br Sembiring and N K Putri.....130

012025

OPEN ACCESS

[Preparation and structural characterization of ZnO thin films by sol-gel method](#)

D Aryanto, W N Jannah, Masturi, T Sudiro, A S Wismogroho, P Sebayang, Sugianto and P Marwoto.....136

012026

OPEN ACCESS

[Analysis of capacity fading effect on Lithium Cobalt cells caused by pulse current technique in fast charging methods](#)

S Hafiz, S Arianto, R Y. Yunaningsih, N Majid and B Prihandoko.....143

012027

OPEN ACCESS

[Comparative study of N719 dye on two different photo-anodes](#)

T Abodunrin, A Boyo, M Usikalu, L Kotsedi, Z Yenus and M Maaza.....148

012028

OPEN ACCESS

[Line profile analysis of ODS steels Fe<sub>20</sub>Cr<sub>5</sub>AlTiY milled powders at different Y<sub>2</sub>O<sub>3</sub> concentrations](#)

A Afandi, R Nisa and K A Z Thosin.....154

012029

OPEN ACCESS

[Green synthesis of silver nanoparticles using \*Carica Papaya\* fruit extract under sunlight irradiation and their colorimetric detection of mercury ions](#)

M Firdaus, S Andriana, Elvinawati, W Alwi, E Swistoro, A Ruyani and A Sundaryono.....160

012030

OPEN ACCESS

[Study of LiBOB compound synthesis by vacuum process as lithium ion battery electrolytes](#)

T Lestariningsih, E Wigayati, C Ratri and Q Sabrina.....166

012031

OPEN ACCESS

[The influence of Sb doping on the structural, optical and electrical properties of tin oxide thin film](#)

M N Yusnidar, V Fauzia, D Handoko and L Hanum.....172

012032

OPEN ACCESS

[Effect of sonication process on natural zeolite at ferric chloride hexahydrate solution](#)

T A B Prasetyo and B Soegijono.....178



012033

OPEN ACCESS

[Phase study of SiO<sub>2</sub>-ZrO<sub>2</sub> composites prepared from polymorphic combination of starting powders via a ball-milling followed by calcination](#)

Musyarofah, R Nurlaila, N F Muwwaqor, M Saukani, A Kuswoyo, Triwikantoro and S Pratapa.....184

### **Laser and Optoelectronics (LO)**

012034

OPEN ACCESS

[The effect of excitation wavelength on plasma spectrum of metals in vacuum condition](#)

A N Hidayah, M M Suliyanti and Isnaeni.....190

012035

OPEN ACCESS

[An SMS \(single mode – multi mode – single mode\) fiber structure for vibration sensing](#)

T B Waluyo and D Bayuwati.....196

012036

OPEN ACCESS

[Design of optical channel waveguide Mach-Zehnder interferometer \(MZI\) for environmental sensor applications](#)

D Mahmudin, N Huda, T T Estu, A A Fathnan, P Daud, S Hardiati, L Hasanah and Y N Wijayanto.....202

012037

OPEN ACCESS

[Design, construction and characterization of fiber extensometer with heart shape structure for detection of displacement](#)

D Bayuwati and T B Waluyo.....208

012038

OPEN ACCESS

[Development of real-time extensometer based on image processing](#)

H Adinanta, P Puranto and Suryadi.....214

012039

OPEN ACCESS

[Aggregation effect on absorbance spectrum of laser ablated gold nanoparticles](#)

Isnaeni, Irmaniar and Y Herbani.....219

012040

OPEN ACCESS

[Determining optimum red filter slide distance on creating 3D electron microscope images using anaglyph method](#)

W P Tresna and Isnaeni.....226

012041

OPEN ACCESS

[Comparison study between static and dynamic responses of optical fiber weight in motion sensor](#)

D Hanto, R K Ula, A Setiono, P Puranto, H Adinanta, T B Waluyo and B Widiyatmoko.....232

012042

OPEN ACCESS

[Development of microcontroller-based acquisition and processing unit for fiber optic vibration sensor](#)

Suryadi, P Puranto, H Adinanta, T B Waluyo and P S Priambodo.....239

012043

OPEN ACCESS

[Improving frequencies range measurement of vibration sensor based on Fiber Bragg Grating \(FBG\)](#)

Qomaruddin, A Setiono and M I Afandi.....245

012044

OPEN ACCESS

[Application of activated zeolite to quantitative analysis of Pb liquid sample using commercial laser-induced breakdown spectroscopy \(LIBS\)](#)

H Suyanto, A P Utomo, M Manurung, W G Suharta and Windaryoto.....251

012045

OPEN ACCESS

[Correlation analysis of solar constant, solar activity and cosmic ray](#)

Y S Utomo.....257

012046

OPEN ACCESS

[Analysis of laser induced plasma of lithium iron phosphate/LiFePO<sub>4</sub> using Nd:YAG laser at low pressure](#)

M M Suliyanti, A N Hidayah and Isnaeni.....264

012047

OPEN ACCESS

[Analysis of dual peak emission from Rhodamine 6G organic dyes using photoluminescence](#)

I T Sugiarto, Isnaeni and K Y Putri.....269

012048

OPEN ACCESS

[Silver nanoparticle formation by femtosecond laser induced reduction of ammonia-containing AgNO<sub>3</sub> solution](#)

Y Herbani, T Nakamura and S Sato.....275

012049

OPEN ACCESS

[Laser-induced photo emission detection: data acquisition based on light intensity counting](#)

N Yulianto, N Yudasari and K Y Putri.....281

012050

OPEN ACCESS

[Design of micro bending deformer for optical fiber weight sensor](#)

R K Ula, D Hanto, T B Waluyo, H Adinanta and B Widiyatmoko.....286

012051

OPEN ACCESS

[Study on acoustic detections of Nd:YAG laser induced breakdown at different wavelengths](#)

K Y Putri, N Yulianto and Y Herbani.....292

### **Magnetism and Superconductivity (MS)**

012052

OPEN ACCESS

[Effect of composition polymeric PVB binder on physical, magnetic properties and microstructure of bonded magnet NdFeB](#)

P Sardjono, Muljadi, Suprapedi, P Sinuaji, Ramlan and F Gulo.....297

012053

OPEN ACCESS

[Effect of Te doping on FeSe superconductor synthesized by powder-in-tube](#)

A Imaduddin, K Nisa, S D Yudanto, H Nugraha and B Siswayanti.....302

012054

OPEN ACCESS

[Microstructures, physical and magnetic properties of BaFe<sub>12</sub>O<sub>19</sub> permanent magnets with the addition of Al<sub>2</sub>O<sub>3</sub>-MnO](#)

E A Setiadi, C Kurniawan, P Sebayang and M Ginting.....307

012055

OPEN ACCESS

[Development of resistance and temperature measurement system for cryogenic equipment](#)

H Nugraha, A Imaduddin, M A J Mulya and B Hermanto.....313

012056

OPEN ACCESS

[Effect of additive Na<sub>2</sub>O on sintering temperature, crystal structure and magnetic properties of BaFe<sub>12</sub>O<sub>19</sub> magnet](#)

Suprapedi, P Sardjono, Muljadi, N Rusnaeni and S Humaidi.....321

012057

OPEN ACCESS

[Preparation and characterization of Fe-Mn-doped Barium Hexaferrite permanent magnet](#)

C Kurniawan, M M Nainggolan, K Sebayang, M Ginting and P Sebayang.....326

012058

OPEN ACCESS

[Fabrication of visible light-triggered photocatalytic materials from the coupling of \*n\*-type zinc oxide and \*p\*-type copper oxide](#)

A B Gorospe and M U Herrera.....332

012059

OPEN ACCESS

[Crystal structure and phase transformation of BiFeO<sub>3</sub> multiferroics on the temperature variation](#)

U Nuraini and S Suasmoro.....337

012060

OPEN ACCESS

[Material processing of oil palm empty fruit bunches for use as raw material of conductive carbon paper](#)

F Destyorini and N Indayaningsih.....342

### **Extractive Metallurgy and Materials Process Engineering (EM)**

012061

OPEN ACCESS

[Elemental analysis and radiation hazards parameters of bauxite located in Saudi Arabia](#)

S Alashrah and A E Taher.....348

012062

OPEN ACCESS

[Powder metallurgy preparation of Mg-Ca alloy for biodegradable implant application](#)

D Annur, A Suhardi, M I Amal, M S Anwar and I Kartika.....355

012063

OPEN ACCESS

[Reduction mechanism of Indonesian limonite ore by solid reducing agents](#)

W Astuti, S Novita and F Nurjaman.....361

012064

OPEN ACCESS

[The effect of pretreatments on the dissolutions of impurities from Indonesian cassiterite mineral](#)

L H Lalasari, A Suharyanto and F Firdiyono.....367

012065

OPEN ACCESS

[Lamtoro charcoal \(\*L. leucocephala\*\) as bioreductor in nickel laterite reduction: performance and kinetics study](#)

H T B M Petrus, A Diga, A R Rhamdani, I W Warmada, A T Yuliansyah and I Perdana.....373

012066

OPEN ACCESS

[The effect of solid solution treatment on the hardness and microstructure of 0.6%wt C-10.8%wt Mn-1.44%wt Cr austenitic manganese steel](#)

F Nurjaman, F Bahfie, W Astuti and A Shofi.....380

### **Surface and Corrosion Science (SC)**

012067

OPEN ACCESS

[Influence of oxidation temperature on the oxide scale formation of NiCoCrAl coatings](#)

E Sugiarti, K A Zaini, R Sundawa, Y Wang, S Ohnuki and S Hayashi.....387

012068

OPEN ACCESS

[The corrosivity and performance evaluation of antifouling paint exposed in seawater Muara Baru Port, Jakarta](#)

L Nuraini, S Prifiharni, G Priyotomo and Sundjono.....393

012069

OPEN ACCESS

[Development of non-thermal atmospheric pressure plasma system for surface modification of polymeric materials](#)

T P Kasih.....400

012070

OPEN ACCESS

[X-ray Photoelectron Spectroscopy \(XPS\) analysis of low oxidation pressure behavior of FeAl –alloys at 600°C and 700°C](#)

H Izzuddin, A Seemayer, G N Ankah, J Lengsfeld, P Schneider and F U Renner.....406

012071

OPEN ACCESS

[Microstructure and phase composition of Fe-B-Al coatings on low carbon steel prepared by using mechanical alloying technique](#)

R Y Sundawa, D Aryanto, A S Wismogroho and T Sudiro.....411

### **Geophysics (GE)**

012072

OPEN ACCESS

[The magnetotelluric phase tensor analysis of the Sembalun-Propok area, West Nusa Tenggara, Indonesia](#)

F Febriani, D S Widarto, E Gaffar, A Nasution and H Grandis.....417

012073

OPEN ACCESS

[What did drive extreme drought event in Indonesia during boreal summer/fall 2014?](#)

I Iskandar, W Mardiansyah, D Setiabudidaya, P Poerwono, I Yusyian and Z Dahlan.....423

012074

OPEN ACCESS

[Shallow dipping structure associated to the Cimandiri Fault: evidence from single station teleseismic receiver function analysis](#)

Syuhada and T Anggono.....429

012075

OPEN ACCESS

[Crustal thickness investigation on three broadband stations in Northern Sumatra](#)

T Anggono, Syuhada, B Soedjatmiko and A Amran.....435