

# **4th International Symposium on Current Progress in Functional Materials (ISCPFM 2019)**

IOP Conference Series: Materials Science and Engineering  
Volume 902

Badung, Indonesia  
6 - 7 November 2019

## **Editors:**

<b>Ivandini T.Anggraningrum</b>	<b>A. Denny Handoko</b>
<b>Young-ill Lee</b>	<b>Djoko Triyono</b>
<b>Yan Mulyana</b>	

ISBN: 978-1-7138-4752-6  
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. (2022)

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

Preface	
Scientific_Committee	
Organizing_Committee	
Sponsor	
Delegate_List	
Peer review declaration	
Preparation of boron-doped diamond modified by bimetal nickel and zinc .....	1
<i>Y M T A Putri, P K Jiwanti, Irkham, J Gunlazuardi, Y Einaga, TA Ivandini</i>	
Influence of TiO <sub>2</sub> 's (101) crystal facet exposure on the photoelectroactivity of TiO <sub>2</sub> nanooctahedra/BiVO <sub>4</sub> nanocomposite .....	6
<i>F Naumi, TA Ivandini, J Y Mulyana, U Pratomo, M Khalil</i>	
TiO <sub>2</sub> /Co <sub>3</sub> O <sub>4</sub> nanocomposite: Synthesis via Catharanthus roseus (L.) G. Don leaf extract, characterization and its photocatalytic activity for malachite green degradation .....	12
<i>T W W Syahfitri, Y Yulizar, J Gunlazuardi, D O B Apriandananu</i>	
Fabrication of Gd <sub>2</sub> O <sub>3</sub> nanoparticles in hexane-water system using Myristica fragrans Houtt leaves extract and their photodegradation activity of malachite green.....	18
<i>A Eprasatyta, Y Yulizar, R T Yunarti, D O B Apriandananu</i>	
Preparation and characterization of β-Cyclodextrin/Fe <sub>3</sub> O <sub>4</sub> nanocomposite .....	24
<i>E Saepudin, S J Willyam, Irkham, TA Ivandini</i>	
Nickel ferrite nanocrystalline as a green and recyclable catalyst for the synthesis of Spiro-oxindole-chromene .....	29
<i>S H Oktavia, A H Cahyana, R T Yunarti</i>	
High stable Hb/Pt/BDD electrode for determining acrylamide in coffee samples .....	37
<i>R Wulandari, E Saepudin, TA Ivandini</i>	
The performance of sodium ion battery with NaFePO <sub>4</sub> cathode prepared from local iron sand.....	44
<i>F Rahmawati, Z Faiz, D A N Romadhona, T E Saraswati, W W Lestari</i>	
Preliminary study of electrooxidation isoeugenol into vanillin using platina and boron-doped diamond electrode .....	51
<i>Hilyatudini, H G Riyanto, W Wibowo, TA Ivandini</i>	
Copper oxide modification to improve the photocatalytic activity of titanium dioxide nanoparticles: P25 versus P90 .....	58
<i>L Yuliati, N Hasan, H O Lintang</i>	
Electroreduction of CO <sub>2</sub> using modified boron-doped diamond electrode as the working electrode .....	66
<i>I Rahmawati, N Y Yetri, J Gunlazuardi, TA Ivandini</i>	
Sm <sub>2</sub> O <sub>3</sub> nanoparticles preparation using caesalpinia pulcherrima leaf extract, characterization and photocatalytic activity .....	72
<i>N Putri, Y Yulizar, A Umar, D O B Apriandananu</i>	

Modification of gold nanoparticles through allyl mercaptan bridge at boron-doped diamond electrode for an arsen (V) sensor.....	77
<i>O Magdalena, N A Fauzillah, H G Riyanto, T A Ivandini</i>	
One-pot synthesis of spirooxindole-pyrrolizidine compounds using magnetically separable Fe <sub>3</sub> O <sub>4</sub> -graphene oxide (Fe <sub>3</sub> O <sub>4</sub> -GO) catalyst.....	83
<i>M Hapsari, A H Cahyana, R T Yunarti</i>	
Synthesis and characterization of monodisperse core-shell Fe <sub>3</sub> O <sub>4</sub> @Au nanostructures .....	93
<i>T Yuliani, M Khalil, J W Hong, T A Ivandini</i>	
Phase system of hexane-water for SnO <sub>2</sub> nanoparticles preparation using Cassia alata leaf extract and its photocatalytic activity .....	99
<i>F L Hakim, Y Yulizar, D O B Apriandanus</i>	
Molecular investigation of modified β-cyclodextrin and cholesterol inclusion complexes through molecular docking simulations .....	105
<i>M A F Nasution, H G Riyanto, E Saepudin, T A Ivandini</i>	
La <sub>2</sub> O <sub>3</sub> nanoparticles formation using Nothopanax scutellarium leaf extract in two-phase system and photocatalytic activity under UV light irradiation .....	111
<i>K Mustofa, Y Yulizar, A Saefumillah, D O B Apriandanus</i>	
Microwave-assisted synthesis of organic corrosion inhibitor based imidazoline-stearic .....	117
<i>D U C Rahayu, S Cahyani, I Abdullah, D A Nurani, Y K Krisnandi</i>	
One-pot four-component synthesis of phenazine derivative using 2-hydroxy-1,4-naphthoquinone .....	123
<i>A H Cahyana, N Nazhifah, A R Liandi</i>	
The optical and high-pressure raman scattering study of La(Fe,Mo)0.5O <sub>3</sub> ceramics .....	129
<i>D Triyono, H Laysandra, R A Rafsanjani</i>	
Sixth-generation of ziegler-natta catalyst for homopolymer polypropylene polymerization: Effect to product properties and regulation .....	134
<i>R I Syahrudin, B A Herlambang</i>	
Synthesis and characterization of soft and hard templated mesoporous carbon using phloroglucinol as carbon precursor.....	142
<i>I Amelia, Y K Krisnandi, I Abdullah</i>	
Investigation on the effect of Zirconium doping on the structural and electrical properties of BiFe <sub>1-x</sub> Zr O <sub>3</sub> with x = 0.01, 0.03 and 0.05 .....	150
<i>Aflahannisa, D Triyono</i>	
Manufacturing of Mg-Al <sub>5</sub> TiB composite and addition of nano-sized Al <sub>2</sub> O <sub>3</sub> through stir casting method with T6 heat treatment temperature variation.....	156
<i>S Yusuf, A Z Syahrial</i>	
Development study of iron-based metal organic frameworks (Fe-based MOFs) as a binding agent in diffusive gradient in thin film method (DGT) for phosphate adsorption.....	165
<i>V Sintya, A Saefumillah, A Zulys</i>	
The influence of calcination temperature on the structural properties of La <sub>2</sub> FeMnO <sub>6</sub> double perovskite materials.....	171
<i>Yunida, D Triyono</i>	

Characteristics of composite magnesium with micro SiC particle for automotive applications with stir casting method.....	177
<i>N R Susilo, A Z Syahrial</i>	
Functionalization of titanium dioxide through dye-sensitizing method utilizing red amaranth extract for phenol photodegradation.....	185
<i>Y S Kurniawan, K Anggraeni, R Indrawati, L Yuliati</i>	
Effect of film fabricating conditions and its implications on mechanical properties of high-density polyethylene film.....	191
<i>B Herlambang, M R O B Anando</i>	
Effect of zirconium substitution on structural and optical properties of lanthanum orthoferrite.....	202
<i>I Purnamasari, D Triyono</i>	
Microstructure and mechanical properties of magnesium Si <sub>3</sub> N <sub>4</sub> reinforced composite fabricated by stir casting method.....	208
<i>A A D Manggaran, A Z Syahrial</i>	
Study of La(Fe, Zn)O <sub>3</sub> on the structural properties prepared by sol-gel method .....	216
<i>F Fajriyani, D Triyono</i>	
Modification of fly ash using acids and alkali by hydrothermal method and its application as adsorbents material for phosphate adsorption in aquatic system.....	224
<i>W R Wulandari, A Saefumillah, R T Yunarti</i>	
An impedance spectroscopy study of sol-gel prepared La <sub>0.9</sub> Sr <sub>0.1</sub> Fe <sub>0.7</sub> Mo <sub>0.3</sub> O <sub>3</sub> perovskite .....	233
<i>D Triyono, R A Rafsanjani, H Laysandra</i>	
Structural and vibrational analysis of LaFe <sub>1-x</sub> Mn <sub>x</sub> O <sub>3</sub> (x = 0.05, 0.10, 0.15 and 0.20) perovskite materials .....	239
<i>M N Abdillah, D Triyono, A W Anugrah, R A Rafsanjani</i>	
Synthesis of biodegradable plastic from corn starch and corn husk filler with addition of glycerol as plasticizer and variation of chitosan composition.....	246
<i>R Azsarinka, D Saleh, E Djonaedi</i>	
Inhibitor effect of PCMB and PMSF towards partially purified product from pineapple core (Ananas comosus [L.] Merr) using gel filtration column chromatography method .....	256
<i>M F Amalia, S Hudiyono, S Setiasih</i>	
Efficiency and potential synthesis of pyrimido [4,5-d] pyrimidine derivatives by iodine catalyst as antioxidant agent .....	262
<i>A H Cahyana, A R Liandi, M Z R Zaky</i>	
A preliminary study on modified chitosan-curcuminoids as material active food packaging with antioxidant and antibacterial activities .....	268
<i>A Azkia, A I Baihaqi, H A Prabowo, Hendri, S Handayani, T Agustiany</i>	
Application of MoS <sub>2</sub> /reduced graphene oxide for photocatalytic degradation of rhodamine B in water environment .....	276
<i>P T T Trang, T T Tam, V Vien, N H Lien</i>	
Methyl orange dye removal using Ni/Fe-NO <sub>3</sub> and Ni/Fe-[ $\alpha$ -SiW <sub>12</sub> O <sub>40</sub> ] layered double hydroxides .....	286
<i>A Lesbani, T Taher, N R Palapa, R Mohadi, A Yuliana, Mardiyanto</i>	

Lanthanum based metal organic frameworks as a new binding agent material for diffusive gradient in thin film (DGT) technique in bioavailability of phosphate removal .....	293
<i>C Santikasari, A Saefullah, A Zulys</i>	
Metal organic frameworks of lanthanum and iron using BDC linker as catalysts for glucose conversion into 5-hydroxymethylfurfural (5-HMF) .....	301
<i>N Riezzati, Y K Krisnandi, A Zulys</i>	
Hierarchical ZSM-5 synthesized from Bangka kaolin and Bayat natural zeolite for methane conversion catalysts.....	308
<i>M Faisal, I Abdullah, Y K Krisnandi</i>	
Synthesis and characterization of lanthanide metal-organic framework with perylene 3,4,9,10- tetracarboxylate ligand .....	317
<i>L C Christina, J Gunlazuardi, A Zulys</i>	
Synthesis of hierarchical Fe2O3/ZSM-5 from natural minerals as catalyst in partial oxidation of bio-methane .....	327
<i>M Rafli, M Faisal, D A Nurani, I R Saragi, Y K Krisnandi</i>	
Synthesis of macroanion [ $\alpha$ -SiW12O40]4- as pillaring agents to layered double hydroxide Zinc- M3+ .....	333
<i>L Silaen, M F Azmi, N R Palapa, R Mohadi, Elfita, A Lesbani</i>	
Catalytic conversion of beef tallow with MgO derived from MgCO3 for biofuels production .....	339
<i>A Riyadhi, Y Yulizar, B H Susanto</i>	
Conversion of delignified stem sorghum bicolor into levulinic acid using micro and mesoporous ZSM-5 catalysts.....	345
<i>Y D I Siregar, E Saepudin, Y K Krisnandi</i>	
Catalytic depolymerization of lignin from wood waste biomass over natural sourced ZSM-5 catalysts .....	352
<i>A P Pratama, Y K Krisnandi, I Abdullah</i>	
Synthesis and characterization of zinc-aluminum and zinc-chromium LDHs intercalated citrate anion .....	359
<i>N Hidayati, M F Azmi, M Oktriyanti, N R Palapa, R Mohadi, Elfita, A Lesbani</i>	
Investigation of metalloporphyrin compound in maltenes of duri crude oil.....	364
<i>Vinny, Y Yulizar, R Ekananda, I Kurniawaty, H Haerudin, D O B Apriandanan</i>	
In vivo study of 8-OHdG as a biomarker DNA damage by combining the exposure of nonyl phenol and copper using ELISA technique .....	371
<i>Budiawan, A D Rizkita, S Handayani, I C Dani</i>	
Synthesis and characterization of metal organic framework using succinic acid ligand with cobalt and iron metals as methylene blue dye adsorbent.....	380
<i>D A Nurani, B C B Butar, Y K Krisnandi</i>	
Cs-137 radionuclide bioaccumulation study in gold fish ( <i>Cyprinus carpio</i> ) through freshwater path with variations of potassium ion concentration (K+) .....	389
<i>T A Baramanda, Budiawan, R Bakri, H Suseno</i>	
Study of bioaccumulation and heavy metal depuration of cadmium in green mussel ( <i>Perna viridis</i> ) .....	395
<i>Budiawan, R Bakri, S A Aziz, H Suseno</i>	

The localized surface plasmon resonance on noble metal-semiconductor: Au nanosphere-ZnO nanorod .....	403
<i>M Sujak, D Djuhana</i>	
Calculation of anisotropic reflectance of SrNbO <sub>3.4</sub> within Density Functional Theory .....	408
<i>G Parusa, A Syahroni, M A Majidi</i>	
The diameter effect on the magnetization switching time of sphere-shaped ferromagnets using micromagnetic approach .....	413
<i>C Kurniawan, A T Widodo, D Djuhana</i>	
Electronic structure of 9 quintuple layers Bi <sub>2</sub> Se <sub>3</sub> within Density Functional Theory .....	419
<i>M Hasan, M A Majidi</i>	
Simulation of critical temperature of FeTe, FeSe and FeTe <sub>0.5</sub> Se <sub>0.5</sub> using equation McMillan .....	425
<i>D P U Asmarakusuma, D Suyanto</i>	
Simple isolation method of cannabinol from Cannabis sativa to produce secondary reference standard analysis material.....	429
<i>N Hidayati, A Saefumillah, A H Cahyana</i>	
The growth rate and chlorophyll content of water hyacinth under different type of water sources.....	439
<i>A A Hasibuan, R Yuniati, W Wardhana</i>	
Acetylation of curcuminoids extract from Turmeric Rhizomes ( <i>Curcuma longa</i> ) as antibacterial compounds against <i>S. aureus</i> and <i>E. coli</i> .....	445
<i>A Fadhlurrahma, E Saepudin, D U C Rahayu</i>	
Phytochemical and antiacne investigation of Indonesian White Turmeric ( <i>Curcuma zedoaria</i> ) Rhizomes .....	452
<i>D A Setyani, D U C Rahayu, S Handayani, P Sugita</i>	
The capacity of water hyacinth as biofilter and bioaccumulator based on its size .....	458
<i>J Elizabeth, R Yuniati, W Wardhana</i>	
Activity of hydrogenated curcuminoid on Pd/C catalyst and its antibacterial activity against <i>Staphylococcus aureus</i> and <i>Streptococcus mutans</i> .....	464
<i>N H Adriani, D U C Rahayu, E Saepudin</i>	
Microwave-assisted synthesis of 7-hydroxy-4-methyl coumarin and its bioactivity against acne-causing bacteria .....	472
<i>A W Winata, D U C Rahayu, S Handayani, H Dianhar</i>	
The Effect of leaf surface character on the ability of water hyacinth, <i>Eichhornia crassipes</i> (Mart.) Solms. to transpire water .....	478
<i>E D Maylani, R Yuniati, W Wardhana</i>	
Utilization of monosodium glutamate (MSG) for the synthesis of 1,8-dioxoacridine and polyhydro-quinoline derivates with SiO <sub>2</sub> -AA-glutamate catalyst and antioxidant ability test .....	485
<i>A H Cahyana, T Andika, A R Liandi</i>	
Reduction of curcuminoid extract from turmeric ( <i>Curcuma longa</i> ) rhizomes and its antibacterial activities .....	492
<i>S Q Dewi, E Saepudin, D U C Rahayu</i>	

Mercury effects on the early seedling of Paraserianthes falcata (L.) Nielsen grew in hydroponic culture.....	498
<i>R Yuniarti, R Yuniati</i>	

Antibacterial activity of curcuminoid derivatives resulted from hydrogenation reaction with Pd-C catalyst from turmeric ( <i>Curcuma longa</i> ) rhizomes extract .....	504
<i>L D Sudewo, E Saepudin, D U C Rahayu</i>	

**Author Index**