

# Table of Contents

## Preface

## Chapter 1: Materials for Solar Cells

<b>Inorganic-Organic Hybrid Perovskite Solar Cells Fabricated with Additives</b> Y. Furukawa, S. Ikawa, H. Kiyohara, Y. Sendai and A. Bahtiar	3
<b>Improved the Performance and Stability at High Humidity of Perovskite Solar Cells by Mixed Cesium-Methylammonium Cations</b> A. Bahtiar, R. Yazibrahmah, A. Aprilia and D. Hidayat	9
<b>The Addition of Reduced Graphene Oxide Layer to TiO<sub>2</sub> Photoanode of DSSC Using UV Oven Spraying Method</b> L. Safriani, A. Aprilia, S. Suryaningsih, F. Yuliasari, M.R. Nurawan, A. Nuroctaviani, E. Dina, T. Amelia, N. Syakir and Fitriawati	15
<b>Effect of Lead-Free Perovskite Cs<sub>2</sub>SnI<sub>6</sub> Addition in the Structure of Dye-Sensitized Solar Cell</b> H. Pujiarti, R. Hidayat and P. Wulandari	22
<b>Performance of Air-Stable Cs<sub>2</sub>SnI<sub>6</sub> Perovskite as Electron Transport Layer in Inverted Bulk Heterojunction Solar Cell</b> R. Khaeroni, Herman and P. Wulandari	28
<b>Photovoltaic Characterization of Hybrid Bulk Heterojunction Solar Cell Incorporated Gold Nanoparticles Embedded in Active Layer</b> N.F. Syarif, R. Hidayat and P. Wulandari	34
<b>Synthesis and Dispersion of Ni-Doped Cu<sub>2</sub>ZnSnS<sub>4</sub></b> C. Panatarani, H. Redianti, F. Faizal, E. Cahya Prima, B. Yuliarto and I.M. Joni	42

## Chapter 2: Materials for Batteries and Supercapacitors

<b>Rolled Supercapacitor Device Model Using Carbon-Sheet as Electrodes in KCl Electrolyte System</b> D.U. Dzujah, R. Hidayat, Fitriawati and N. Syakir	53
<b>Synthesis of Carboxymethyl Cellulose Form Banana Stems and its Characterization for Anode Binder of Li-Ion Battery</b> S. Hidayat, L. Rohmani, B. Adiperdana, F. Faizal, Y.W. Hartati and I. Rahayu	59
<b>The Influence of Mechanical Milling on the Electrical Conductivity of LiFeSi<sub>0.03</sub>P<sub>0.97</sub>O<sub>4</sub>/C Composite Materials</b> M. Zainuri, H.E. Della and B.A. Subagyo	64
<b>The Effect of Gadolinium Ion Doping on Electronic Conductivity of LiFePO<sub>4</sub>/C</b> I. Rahayu, E.E. Ernawati, A.R. Noviyanti, Y. Linda, D. Rakhmawaty, A. Suprabawati, A. Anggraeni, H.H. Bahti and S. Hidayat	69
<b>Active Materials LiFeSi<sub>x</sub>P<sub>1-x</sub>O<sub>4</sub>/C as Lithium Ion Battery Cathode with Doping Variations Si Ions (0≤x≤0,06)</b> M. Zainuri, Triwikantoro and P.A. Zahra	75

## Chapter 3: Advanced Ceramics

<b>Fe<sub>3</sub>O<sub>4</sub>.SiO<sub>2</sub>: A Study of Structural and Magnetic Properties in Various Volume of Tetraethyl Orthosilicate</b> T. Saragi, H.D. Sinaga, F. Rahmi, G.A. Pramesti, A. Sugiarto, A. Therigan, B. Permana, N. Syakir and R. Risdiana	83
<b>Effect of Different Synthesis Methods on Structural, Morphological and Magnetic Properties of La<sub>0,7</sub>Ba<sub>0,25</sub>Nd<sub>0,05</sub>MnO<sub>3</sub></b> D.R. Munazat, B. Kurniawan, D.S. Razaq, I.N. Rahman, A. Sudarmaji, D. Handoko, D. Nanto and W.B.K. Putri	89

<b>Structural and Morphological <math>\text{La}_{0.85-x}\text{Ba}_x\text{Na}_{0.15}\text{MnO}_3</math> (<math>x = 0, 0.05, 0.10</math> and <math>0.15</math>) Perovskite Manganite</b>	95
I.N. Rahman, B. Kurniawan, D.S. Razaq, A. Sudarmaji and D.R. Munazat	
<b>Structure and Morphology of Copper Substituted in <math>\text{La}_{0.667}\text{Ba}_{0.333}\text{Mn}_{1-x}\text{Cu}_x\text{O}_3</math> (<math>x = 0.35</math> and <math>0.40</math>)</b>	101
R.F. Syahrizal and B. Kurniawan	
<b>Structure and Morphology Properties of Nanosized <math>\text{La}_{0.75}\text{K}_{0.05}\text{Ba}_{0.05}\text{Sr}_{0.15}\text{MnO}_3</math> Manganite</b>	106
D.S. Razaq, B. Kurniawan, I.N. Rahman and D.R. Munazat	
<b>The Influence of Cu Substitution on the Crystal and Morphological Structure of <math>\text{Ca}_{0.9}\text{La}_{0.05}\text{Bi}_{0.05}\text{Mn}_{1-x}\text{Cu}_x\text{O}_3</math> (<math>x = 0, 0.025, 0.05, 0.075</math>, and <math>0.1</math>) Manganites</b>	112
B.B. Arbianto, B. Kurniawan and A. Sudarmaji	
<b>Effect of Ni Substitution to Structure and Morphology of <math>\text{Ca}_{0.9}\text{La}_{0.05}\text{Bi}_{0.05}\text{Mn}_{1-x}\text{Ni}_x\text{O}_3</math> by Sol-Gel Method</b>	117
M.A.N. Nur and B. Kurniawan	
<b>Conductivity of Lanthanum Silicate Apatite Derived from Rice Husk</b>	122
A.R. Noviyanti, Y.B. Yuliyati, Solihudin, I. Rahayu, D.G. Syarif and R. Risdiana	
<b>Particle Size Analysis of the Synthesized <math>\text{Al}_2\text{O}_3</math> by Dissolution and Alkali Fusion-Coprecipitation Methods</b>	128
C.F.K. Murti, M.A. Baqya, Endarko and Triwikantoro	

## Chapter 4: Superconductivity and Superconductors

<b>Anisotropy of Lower Critical Field in Organic Layered Superconductor <math>\lambda</math>-(BETS)<sub>2</sub>GaCl<sub>4</sub></b>	137
D.P. Sari, N. Rui, K. Hiraki, T. Nakano, M. Hagiwara, Y. Nozue, T. Kusakawa, A. Hori, I. Watanabe and Y. Ishii	
<b>Variable Range Hopping Resistivity in <math>\text{La}_{2-x}\text{Sr}_x\text{CuO}_4</math> Nanoparticles Evaluated by Four Point Probe Method</b>	142
S. Winarsih, F. Budiman, H. Tanaka, T. Adachi, T. Goto, B. Soegijono, B. Kurniawan and I. Watanabe	
<b>The Dependence of Magnetic Moments on Magnetic Impurities of Ni in <math>\text{Eu}_{1.86}\text{Ce}_{0.14}\text{Cu}_{1-y}\text{Ni}_y\text{O}_{4+a-d}</math></b>	148
M.A. Syakuur, Y. Maryati, U. Widyaishwari, D.P. Sari, T. Saragi and R. Risdiana	
<b>Spin Alignment Studies on the Muon-Site Determination in <math>\text{La}_2\text{CuO}_4</math></b>	154
M.R. Ramadhan, I. Ramli, D.P. Sari, B. Kurniawan, A. Manaf, M.I. Mohamed-Ibrahim, S. Sulaiman and I. Watanabe	
<b>Study of Purity and Electrical Resistivity of <math>\text{Eu}_{1.91}\text{Ce}_{0.09}\text{CuO}_4</math> and <math>\text{Eu}_{1.84}\text{Ce}_{0.16}\text{CuO}_4</math></b>	160
Y.R. Tayubi, Y. Maryati, N. Nafisah, D.G. Auliya, E. Nurwati, T. Amalia, M.A. Syakuur, Wiendartun, S. Feranie, T. Saragi and R. Risdiana	
<b>The Effect of Interaction Weight on Dipole Field Calculations to Reconstruct the <math>\text{La}_2\text{CuO}_4</math> <math>\mu\text{SR}</math> Spectrum</b>	165
B. Adiperdana and R. Risdiana	

## Chapter 5: Carbon Materials

<b>Synthesis of High Quality Porous Carbon from Water Hyacinth</b>	173
O. Nurhilal, R.S. Lesmana, K. Ramadayanti, S. Habibah, S. Hidayat, D. Sumiarsa and R. Risdiana	
<b>Carbon Extraction from Rice Husk and its Application as a Microwave Adsorbent</b>	178
Yusmaniar, S. Juwita, W.A. Adi, M.R. Fuazi and E. Handoko	
<b>Electronic Properties of Nitrogen- and Boron-Doped Amorphous Carbon (a-C:N and a-C:B) Films from Palmyra Sugar</b>	185
A.Z. Laila, K. Nadiyyah, I.S. Ardiani, B. Priyanto and Darminto	
<b>Structural Analysis of Boron- and Nitrogen-Doped Amorphous Carbon Films from Bio-Product</b>	190
I.S. Ardiani, K. Nadiyyah, A.Z. Laila, S. Tunmee, H. Nakajima, B. Priyanto and Darminto	
<b>Electrical Characterization of N- and B- Doped Amorphous Carbon Film from Palmyra Sugar</b>	196
K. Nadiyyah, A.Z. Laila, I.S. Ardiani, B. Priyanto and Darminto	

## **Chapter 6: Materials for Biomedical Application**

<b>Synthesis and Characterization of Zn-Mg Alloys as Biodegradable Materials</b>	
A. Supardi, S. Willy and D. Hikmawati	205
<b>Characterization of Microstructure and Composition of Plasma Electrolytic Oxide Film Formed on AZ31 Mg Alloy</b>	
E. Hidayati and A. Anawati	213
<b>Effect of Solution Treatment on Microstructure and Mechanical Hardness of Ti-6Al-7Nb</b>	
D. Maharani, A. Anawati, I.N. Jujur and Damisih	218
<b>Fabrication of Compact Magnesium Disk by Spark Plasma Sintering</b>	
D. Wirani, A. Anawati and T. Sudiro	223
<b>The Effect of Temperature Synthesis on the Purity and Crystallinity of Hydroxyapatite</b>	
A. Yusuf, N.M. Muhammad, A.R. Noviyanti and R. Risdiana	228
<b>Synthesis of Polydimethylsiloxane and its Monomer from Hydrolysis of Dichlorodimethylsilane</b>	
S. Setiadji, E. Sumiyanto, Fitriawati, N. Syakir, A.R. Noviyanti, I. Rahayu and R. Risdiana	234
<b>Fabrication of Hydroxyapatite Coating on Commercially Pure Ti by Electrophoretic Deposition Technique</b>	
S. Rahmadani, A. Anawati, I.N. Jujur and R. Hanafi	239
<b>The Effect of Ultraviolet Exposure on Physical Properties of Electrospun Nanofiber Membrane Based on Polyvinyl Alcohol and <i>Aloe vera</i></b>	
D. Hikmawati, N.P. Maharani, A.P. Putra and Siswanto	244

## **Chapter 7: Functional Materials**

<b>Palladium Role in Growth of ZnO Nanostructure with Plasmonics Layering by Seed Mediated Hydrothermal Method</b>	
Y. Albaihaqi, R. Abdi, S. Natalia, R.F. Syahputra, A. Awitdrus and I. Iwantono	253
<b>Absorption Electromagnetic Waves in X-Band Range Using Barium M-Hexaferrite Dopping Zn Ions and Polyaniline Conductive with Variation of Thickness Coating</b>	
M. Zainuri, Triwikantoro and D.A. Primadani	260
<b>The Effect of Variation Concentration Sodium Hydroxide (NaOH) on the Structure of Calcium Carbonate (<math>\text{CaCO}_3</math>) Based on Natural Sand</b>	
L. Silvia, Amilia, L. Awathifi, Mashuri, Z. Arifin, B.A. Subagyo, H. Sukamto, S.Y. Purwaningsih, Y.D. Hapsari, Sudarsono, Mariyanto, M.A. Baqiya, Y. Cahyono and M. Zainuri	267
<b>ZnO Thin Films Prepared Using the Ultrasonic Spray Pyrolysis Method for High Performance Metal Oxides-Based Photoconductors</b>	
N.A. Putri, C. Imawan and V. Fauzia	274
<b>Basis Set Effects in Density Functional Theory Calculation of Muoniated Cytosine Nucleobase</b>	
W.N. Zaharim, S. Sulaiman, S.S. Mohd Tajudin, S.N. Abu Bakar, N.E. Ismail, H. Rozak and I. Watanabe	282
<b>Magnetic Properties of Pyrochlore Ruthenate <math>\text{Nd}_2\text{Ru}_2\text{O}_7</math> Studied by <math>\mu\text{Sr}</math></b>	
U. WidyaSwari, H. Sakai, K. Inoue, N. Hanasaki, D.P. Sari, B. Kurniawan and I. Watanabe	288

## **Chapter 8: Polymers and Composites**

<b>Temperature in the Extraction Process: The Number of Cavities Created in Polymer Based on Molecularly Imprinted Polymer (MIP) Caffeine</b>	
I. Royani, J. Rahmayani, Maimuna, E. Koriyanti, Jorena, K. Saleh and F. Monado	297
<b>Metal-Polymer Composite as an Acoustic Attenuating Material for Ultrasonic Transducers</b>	
D. Hidayat, N.S. Syafei, B.M. Wibawa, M. Taufik, A. Bahtiar and R. Risdiana	303
<b>Morphology of Micro-Porous Membrane of Waste Cigarette Butts Using Phase Inversion Method</b>	
Setianto, L.K. Men, A. Bahtiar, B.M. Wibawa and D. Hidayat	310

<b>Effect of Concentration and Nozzle-Collector Distance on the Morphology of Nanofibers</b>	315
I. Fatimah, T.I. Sari and D. Anggoro	
<b>Electrodepositing Ni-TiN/Si<sub>3</sub>N<sub>4</sub> Composite Layer with Variation of Current Density</b>	320
E. Budi, Y. Oktaviani, A. Fikry, W. Indrasari, I. Sugihartono and T.B. Prayitno	

## **Chapter 9: Materials and Technologies for Environmental Engineering**

<b>Study of Low Temperature Preparation of Al Doped ZnO Powder and its Photocatalytic Properties</b>	
A. Aprilia, D.P. Hanavi, C. Ghina Afrilia, A. Bahtiar, S. Suryaningsih and L. Safriani	329
<b>Feasibility of Ceria Nanocrystal Adsorbent for Amoxicillin Removal from Water</b>	
I. Nurhasanah, Kadarisman, V. Gunawan and H. Sutanto	338
<b>The Effect of Fermentation Process on Physical Properties of Organic Material from Domestic Food Waste</b>	
Y. Andriani, W. Lili, I. Zidni, M.F. Wiyatna and R. Risdiana	345
<b>Carbon Nanofibers Form by Electrospinning with Flowrate Variations as Electrodes for Capacitive Deionization</b>	
D. Anggoro, I. Muhslas and I. Fatimah	351