

Table of Contents

Preface, Conference Organizers and Committees

Chapter 1: Mathematical Theory and Numerical Methods

Load Support Improvement on Superhydrophobic Surface in Lubricated-MEMS Using Numerical Investigation	
Muchammad, M. Tauqirrahman, J. Jamari and D.J. Schipper	3
Application of Serpentine Flux Path Method into a Magnetorheological Valve by FEMM Simulation	
A.Y. Abd Fatah, S.A. Mazlan, H. Zamzuri and M.A. Abdul Rahman	7
Fluctuation Theorem Application on 2-D Granular Materials Configurations	
S. Viridi, S. Nurul Khotimah, Novitrian and Widayani	12
Numerical Investigation of the Plastic Contact Deformation between Hemispheres: Variation of Radii Ratio and Normal Loads	
R. Ismail, T. Prasojo, M. Tauqirrahman, J. Jamari and D.J. Schipper	16
Optimization of Solvent System and Polymer Concentration for Synthesis of Polyvinyl Alcohol (PVA) Fiber Using Rotary Forcespinning Technique	
M.M. Munir, A. Fauzi, A.Y. Nuryantini, Nursuhud, E. Sofiari and K. Khairurrijal	20
A Symbolic Computation of the Gravity Effect on the Electromagnetic Properties of Materials	
A. Hermanto	24
Numerical Solutions to Fast Transient Pipe Flow Problems	
S. Mungkasi, A. Prasetyadi and F.A.R. Sambada	27
Longitudinal Profiles of Atom Laser Propagation in a Cigar-Shaped Trap	
T.B. Prayitno, Widyanirmala, I.H. Belfaqih, T.E.K. Sutantyo and I.M. Astra	31
Performance Simulation on a Magnetorheological Valve Module Using Three Different Commercial Magnetorheological Fluid	
B. Ichwan, S.A. Mazlan, F. Imaduddin, Ubaidillah and H. Zamzuri	35
The Effect of a Hydrophobic Coating Material on Friction in a Micro-Slider Bearing: A Numerical Analysis	
M. Tauqirrahman, Muchammad, R. Ismail, J. Jamari and D.J. Schipper	42
Theoretical Studies of the Effects of Magnetic Field on the Phase Transition of Swollen Liquid Crystal Elastomers	
Warsono, Y. Yusuf, P. Nurwantoro and K. Abraha	46
Investigation on the Elastic Modulus of Rubber-Like Materials by Straight Blade Indentation Using Numerical Analysis	
B. Setiyana, F.D. Wicahyo, R. Ismail, J. Jamari and D.J. Schipper	55

Chapter 2: Materials Synthesis and Properties Research

Estimation of Van der Waals Interaction Using FTIR Spectroscopy	
Masturi and Sunarno	61
Investigation on the Effect of B_2O_3 Additive on Microstructure and Magnetic Properties of Barium Hexaferrite	
A.Y. Sari, D. Ginting, P. Sebayang, P. Sardjono, C. Kurniawan and M.N. Nasrudin	65
Characterization of Main-Chain Liquid Crystal Elastomers by Using Differential Scanning Calorimetry (DSC) Method	
Supardi, Y. Yusuf and Harsoyo	69
Transition Insulator-Metal and Antiferromagnetic-Paramagnetic Cu Doped in $La_{0.47}Ca_{0.53}MnO_3$	
Y.E. Gunanto, K. Sinaga, B. Kurniawan, S. Poertadji, H. Tanaka, T. Ono, E. Steven and J.S. Brooks	73

The Effect of KOH Activation in Synthesis and Characterization of Zeolitic Imidazolate Frameworks-8 (ZIF-8) Templatized Mesoporous Carbon	
M. Alifah, V.A. Devianti, A. Mukminin, Y. Rachmawati, M. Ainul Fahmi and R. Ediati	78
The Effect of Low Vacuum Curing to Physical and Magnetic Properties of Bonded Magnet Pr-Fe-B	
C. Kurniawan, R.M. Hutahaean and Muljadi	84
The Effect of Powder Particle Size on the Structural and Magnetic Properties of Bonded NdFeB Magnet	
D. Aryanto, Z. Ray, T. Sudiro, A.S. Wismogroho and N. Sudrajat	88
Poly(aniline-co-m-aminobenzoic acid): A Novel Ester Vapor Sensor and its Thin Film Deposition on Silane Functionalized SAM Glass Surface	
J. Singh, R. Banerjee and B. Adhikari	92
Preparation, Characterization and Catalytic Activity of Sulfated Zirconia by Varied Sol-Gel Method	
I. Fatimah and Z. Zuhrufa	96
Synthesis of $\text{LiCo}_x\text{Mn}_{2-x}\text{O}_4$ by Low Temperature Solid-State Reaction for Cathode Material	
D. Purwaningsih, R. Roto, Narsito and H. Sutrisno	100
Texture Analysis of the Hot Rolling Austenitic Cr-Ni Steel Using Neutron Diffraction Method	
T.H. Priyanto, N. Effendi and Parikin	104
The Effect of Milling Time and Sintering Temperature on Synthesis of PbTiO_3 by Mechanical Alloying	
R. Fajarin, H. Purwaningsih and F. Nugroho	109
Microstructure of AA7075 Based Composite by Accumulative Roll Bonding Process	
A. Pramono, L. Kollo and R. Veinthal	114
Aluminum-Carbon Metal Matrix Composites: Effect of Carbon Fiber and Aspect Ratio on the Mechanical Properties	
H. Junaedi, H.S. Abdo, K.A. Khalil and A.A. Almajid	119
Crystalline Characterization and Dielectric Constant of Barium Strontium Titanates Prepared by Solid State Reaction	
R. Maharsi, A. Jamaluddin, A. Supriyanto and Y. Iriani	123
Development of Geopolymer from Fly Ash and Metallurgical Slag	
T. Walmiki Samadhia and N. Muan	127
Magneto-Conductance Effect of Natural Porphyrin Thin Films Fabricated by Spin Coated Method	
Utari, M. Musta'in, B. Purnama, Mudasir and K. Abraha	131
The Effect of Mixing Time on the Morphology and Mechanical Properties of <i>Imperata cylindrica</i> Cellulose	
S. Wuryanti, S. Poertadji and B. Soegijono	135
Thermoelectric Properties Enhancement of NaCo_2O_4 through Ca Atom Partial Substitution on Na Atom	
E. Ermawan and S. Poertadji	140

Chapter 3: Eco-Friendly and Biocompatible Materials

The Influence of Alkali Treatments on Tensile Strength and Surface Morphology of Cellulose Microfibrils	
H. Sosiasi, H. Pratiwi, D.A. Wijayanti and Soekrisno	147
The Effect of Glycerol and Oil Palm Empty Fruit Bunches Microcrystalline Cellulose Loading on Tensile Properties and Water Absorption of Cassava Starch Composite	
N. Hairani, H. Harahap, T. Herawan and Taslim	151
Beneficiation of Derived Bovine Bone Waste Hydroxyapatite Obtained from Meatballs Sellers and its Characterization	
D. Asmi	155
Preliminary Study on the Biocompatibility of Stainless Steel 316L and UHMWPE Material	
I.B. Anwar, E. Saputra, J. Jamari and E. van der Heide	160
A Bipolar Artificial Hip Joint Design for Contact Impingement Reduction	
E. Saputra, I.B. Anwar, J. Jamari and E. van der Heide	164

Chitosan Membrane with Blending of Rice Hull Ash Silica and Polyethylene Glycol for Cu(II) Adsorption in Aqueous Solution	169
F.W. Mahatmanti, Nuryono and Narsito	
Synthesis of Biodegradable Plastic Films from Oil Palm Empty Fruit Bunch Cellulose	173
T. Herawan and M. Rivani	
The Influence of Heat and Two Stages Precipitation in the Process of Natural Polymer Purification from the Byproduct of Bioethanol Process Base on Empty Palm Fruit Bunch	177
A. Hanafi, H. Budiman and F. Aulia	
Preparation of Chitosan-Alginate/PES Pervaporation Membranes for Bioethanol Dehydration	182
M.A. Pratiwi, R.W. Sudrajat, S. Sutanti and H. Susanto	
The Influence of Adding Bio Inhibitor Sarang Semut (<i>Myrmecodia pendans</i>) to Carbon Steel API 5L Grade B in Solution of HCl 1 M	187
A. Pradityana, Sulistijono and A. Shahab	
The Effect of Sandblasting and Electropolishing on the Surface Roughness and Corrosion Rate of AISI 316L Stainless Steel	192
Suyitno, Ishak, P. Dewo, R. Dharmastiti, R. Magetsari, U.A. Salim and L. Hidayat	
The Effect of the Wall Thickness on Wear of an UHMWPE Acetabular Liner	196
J. Jamari, A. Hidayat, E. Saputra, I.B. Anwar, R. Ismail and E. van der Heide	
Sputtering of Titanium in Co-Cr-Mo Alloys for Orthopedic Implant Materials	201
G.S. Sulistioso, B. Bandriyana and B. Siswanto	
Comparison between Conventional and Ultrasonic Preparation of Chitosan from Shrimp Shells Waste	205
Z. Arifin and D. Irawan	
Synthesis of Isopropyl Esters from Jatropha Curcas Oil at Short Time Reaction	209
M. Irwan, H. Saidi and M.A. Rahman	
Effect of Acidic and Basic Environment to the Degradation Behavior of PLGA Nanocapsules for Biomedical Application	213
R.N. Baiti, H. Ardhyananta and K. El Kirat	

Chapter 4: Nanomaterials - Synthesis and Application

Evolution of ZnO Nanoflower-Like Structure Formation and Growth during Synthesis and Paste Preparation	219
M. Iqbal, R. Mahendra, R.A. Wahyuono, D. Sawitri and D.D. Risanti	
Study on Morphology of Electrospun SiOC Fibers	223
J. Setiawan, S. Priyadi, Pranjono, S. Poertadjie and Sigit	
The Influence of ZnO Components on the Photocatalytic Activity of Fe₃O₄-CuO-ZnO Nanocomposites	227
I.K. Susanto, A. Taufik and R. Saleh	
Synthesis of Sulfur-Doped Carbon Dots by Simple Heating Method	233
H. Dany Rahmayanti, Sulhadi and M.P. Aji	
Fabrication of PVA Fibers Loaded with Fe₃O₄ Nano Particles Using Electrospinner	237
Harsjojo, A.F. Waluyo, H. Sosiati and K. Triyana	
Physical Properties and Photocatalytic Activity of Fe- and Co-Doped ZnO Nanoparticles Synthesized via Surfactant Modified Co-Precipitation	241
A. Noorhidayati, S. Adriani and R. Saleh	
Fabrication of Carbon Nanomaterial Using Arc-Discharge in Liquid Method for Battery Application	247
M. Anwar, P.R. Argawan, C. Sukmaji Indro, T.E. Saraswati, A. Purwanto and M. Nizam	
Synthesis and Fabrication of Nanoparticle-Based Thin Layer of Natural Porphyrin	252
D. Sulistyana, E.F. Fonita, Utari, B. Purnama, R. Suryana and K. Abraha	
Effect of Temperature on Silver Nanorods Synthesized by Polyol Method	256
Junaidi, K. Triyana, H. Sosiati, E. Suharyadi and Harsoyo	
Influence of Grain Size to Resistivity Relaxation of La_{0.7}Sr_{0.3}MnO₃ Nanoparticles	260
C.F. Naa, D. Fasquelle, M. Mascot, Suprijadi, S. Viridi and M. Djamal	

Photocatalytic Decolorization of Malachite Green in the Presence of Fe₃O₄/TiO₂/CuO Nanocomposites	264
S.A. Arifin, S. Jalaludin and R. Saleh	
Synthesis and Characterization of Al₂O₃ Nanoparticles and Water-Al₂O₃ Nanofluids for Nuclear Reactor Coolant	270
D.G. Syarif and D.H. Prajitno	
Effect of the Concentration of Zinc Oxide Nano Fluid for Enhancing the Performance of Stirling Engine	274
Suyitno, D. Dwi Prija Thahjana, Sutarmo, S. Hadi and A. Emhemed	
Fabrication of Poly(acrylonitrile)/PAN Nanofiber Using a Drum Collector Electrospinning System for Water Purification Application	281
M.M. Munir, M. Prama Ekaputra, A. Rajak, A. Rahma, A.Y. Nuryantini and K. Khairurrijal	
Photocatalytic Degradation of Methylene Blue Using TiO₂/Carbon Nanoparticles Fabricated by Electrical Arc Discharge in Liquid Medium	285
T.E. Saraswati, I.F. Andhika, Patiha, C. Purnawan, S. Wahyuningsih and M. Anwar	
Transition Metal (Ni, Cr)-Doped ZnO Assisted CTAB Performance on Decolorization of Organic Dyes	289
A. Noorhidayati, R. Philipus, M.P. Rachmawati and R. Saleh	
Photocatalytic Degradation of Methylene Blue and Methyl Orange with Fe-Doped ZnO Nanoparticles Modified with Natural Zeolite and Montmorillonite: Comparative Study	295
N. Afifah, S. Adriani, N.F. Djaja and R. Saleh	
Thermal Characterization of Bacterial Cellulose/Polyvinyl Alcohol Nanocomposite	303
A.Z. Abidin and H.P.R. Graha	
Effect of Catalyst Preparation Method on the Characteristics of Carbon Nanospheres as Anode Materials of Lithium Secondary Batteries	308
A. Andreas Arie, H. Kristianto, R.F. Susanti, M. Halim and J.K. Lee	
In Vitro Release Characteristics of Hydrophobic Breast Cancer Drug Loaded Poly Lactic-co-Glycolic Acid (PLGA) Nanoparticles	312
A.J. Siddiqa, K. Chaudhury and B. Adhikari	
Montmorillonite Incorporated in Cr Doped ZnO Nanoparticles for Degradation of Organic Dyes in Water under UV Light Irradiation	316
V.T. Carmida, M.P. Rahmawati, N.F. Djaja and R. Saleh	

Chapter 5: Materials Manufacturing, Processing and Applications

Co-Sensitization Promoted Light Harvesting Capability of Dye-Sensitized Solar Cell (DSSC) Using Anthocyanin-Based Dye	325
I. Eka Putri, M. Leonard Sidik, R.A. Wahyuono, D. Sawitri and D.D. Risanti	
The Effect of Addition of Indigenous Silica Powder from Lampung on the Concrete Performance after 1 Year Curing Time	329
A.S. Wismogroho, W.B. Widayatno, T. Sudiro and D. Aryanto	
Utilization of Fly Ash for a Support Layer of Pervaporation Membrane	333
E. Apriyanti, S. Šubekti, M.A. Pratiwi, I.N. Widiasa and H. Susanto	
The Effect of Sokka Clay on the Tensile and Burning Properties of rPP/Clay Composite	338
K. Diharjo, N.S. Suharty, A.E.B. Nusantara and R. Afandi	
Hot and Cold of Pressing Effect on ECAP-Parallel Channel Composite Based on Al/ANF Material	343
A. Pramono, L. Kommel, L. Kollo and R. Veinthal	
Reducing Energy Consumption through Innovative Glass Layering Construction with Polyethylene Bubble Wrap at 2nd Floor Dean Faculty Room	348
A.B.K. Putra, Widyastuti, D. Anton, A.G. Safitra and E. Novianarenti	
Effect of Drying Time on Mechanical Properties of Natural Rubber Products Filled with Modified Kaolin Prepared from Latex Dipping	352
H. Harahap, E. Surya, I. Surya, B. Azahari and I. Hanafi	
High Temperature Oxidation of the Hot Rolled ZrNbMoGe Alloy for Fuel Cladding Material of Pressurized Water Reactor	356
Bandriyana, A.K. Rivai, J.H. Prajitno and A. Dimyati	

Sensitivity Improvement of Conducting Polymer Based Sensor to Vehicle Emission Gas by Using Imprinting Method	360
L. Aba, I.N. Sudiana and V.H.R. Mongkito	
Highly Oriented ZnO:Al Thin Films as an Alternative Transparent Conducting Oxide (TCO) for Windows Layer of Solar Cells	364
P. Marwoto, Sugianto, S. Sulhadi, D. Aryanto, E. Wibowo and Yanti	
Physical and Chemical Modification of Sorghum Flour for the Potential Substitute of Wheat Flour	368
H. Susanto, M. Fitrianingtyas, N. Rokhati, A. Hakiim and F. Sistihapsari	
Potential Implementation of Electronic Waste Based Magnetite Powder for Magnetorheological Elastomers	373
Ubaidillah, I. Yahya, Harjana, S.A. Mazlan, J. Sutrisno and H. Zamzuri	
Shellac Coated Hydroxyapatite (HA) Scaffold for Increasing Compression Strength	378
j. triyono, S. Susmartini, E. Susilowati and S.A. Murdiyantara	
Use of Natural Silica Sand as a Component for Prospective Fuel Cell Sealing Materials	383
Musyarofah, U. Nurbaiti, E. Dewa, Triwikantoro, Mashuri, S. Firdaus and P. Suminar	
Effect of Aging on Mechanical Properties of Natural Rubber Latex Products Filled with Alkanolamide-Modified Cassava Peel Waste Powder (CPWP)	387
H. Harahap, A. Hartanto, K. Hadinatan, I. Surya and B. Azahari	
Apparent Activation Energy in High Frequency Microwave Sintering of Alumina Ceramic	391
I.N. Sudiana, S. Mitsudo, S. Inagaki, L.O. Ngkoimani, U. Rianse and H. Aripin	
Heating Time Dependent Pore Size of Porous Composite from Waste Glass	397
S. Sulhadi, Susanto, P.A. Wiguna, M.I. Savitri, M.A. Nur Said and M. Prasetya Aji	
Identification of Carbon Dots in Waste Cooking Oil	402
M. Prasetya Aji, P.A. Wiguna, Susanto, R. Wicaksono and Sulhadi	