# TABLE OF CONTENTS

Morphological and Thermal Properties of LDPE/EVA Blended Films and Development of Antimicrobial Activity in Food Packaging Film .................................................. 1
Kasemsan Wattanawinrat, Poonsub Threepopnatkul, Chanin Kulsetthanchalee

Gold Nanoparticles-based Colorimetric Sensor for Cysteine Detection ........................................ 10
Suriyapha Jongsinakool, Khwanthao Natwara, Natvara Bousod, Sirivan Teepoo

The Effects of Alkalized and Silanized Woven Sisal Fibers on Mechanical Properties of Natural Rubber Modified Epoxy Resin ................................................................. 19
S. Sriwatan, N. Prasoteopha, N. Suppakarn, P. Chumsamrong

Effect of Microwave Curing Conditions on High Strength Concrete Properties ........................ 26
Rathasak Prommas, Thawesak Rungsakthaveekul

A Thin Film Electrode Solid Oxide Fuel Cell Model ................................................................. 35
Penyarat Saisirivat

Synergy Effects of Wood Flour and Fire Retardants in Flammability of Wood-plastic Composites 48
Toshikazu Umemura, Yoshihiko Arato, Sakti Nakamura, Yuji Tomita, Tatsuya Tanaka

The Effect of Injection Speed on Morphology and Mechanical Properties of Polyoxyethylene/Poly(Lactic Acid) Blends ......................................................... 57
Sachalinee Mathurosemonti, Pinitnoo Jwongswan, Satoshi Nagai, Hiroyuki Hamada

Reinvestigation Thermoelectric Properties of CuAlO2 ............................................................ 65
Chesta Rutthasopan, Wattana Kosalyot, Chalempol Rodrakawong, Phumin Jindajitawat, Pratthan Buranasiri, Daengdesh Naoki, Naorochanakorn, Adul Harunwungyong, Warawoot Thowludda, Worakarn Neeyakorn, Chanchana Thunachayanont, Anek Charoenphakdee, Aree Wichainchai

Tensile Properties of Bamboo, Jute and Kenaf Mat-reinforced Composite .................................. 72
Toshikazu Umemura, Zhihao Xu, Yuqiao Yang, Hiroyuki Hamada

Evaluation of Toxic and Trace Metals in Thai Fish by INAA .................................................... 80
Arporn Busamongkol, Wannari Srinuttakul, Pratana Kesawat, Kunchit Judprasong

Elemental Analysis of Brown Rice by Inductively Coupled Plasma Atomic Emission Spectrometry
and Instrumental Neutron Activation Analysis ........................................................................... 85
Wannari Srinuttakul, Arporn Busamongkol

Simplified Modeling of Metal Oxide Surge Arresters ................................................................. 92
Pramuk Unahalekhaka

Effect of TiO2 and ZnO on Thin Film Properties of PET/PBS Blend for Food Packaging Applications 102
Poonsub Threepopnatkul, Chanikarn Wongnarat, Wirawan Intolo, Sanantra Suato, Chanin Kulsetthanchalee

Synthesis of Hydroxyapatite from Oyster Shell via Precipitation ............................................. 112
Sawittree Rujitanapanich, Pipon Kumpapan, Panthong Wanjanon

The Influence of Micro-/Nano-CaCO3 on Thermal Stability and Melt Rheology Behavior of Poly(Lactic Acid) ................................................................. 118
Bawornkit Nekhamanurak, Pajaira Patanathabut, Nattakarn Hongeriphan

Batch Simulation of Multistage Countercurrent Extraction of Uranium in Yellow Cake from Monazite Processing with 5% TBP/Kerosene ......................................................... 129
Uthaiwan Injarean, Pipat Pichestapong, Pratana Kesawat, Junthorn Luaphornkornchatiphan

Performance Improvement of PS from Expanded Polystyrene Off-grade ................................. 135
Chatrawee Direksilp, Poonsub Threepopnatkul

The Study of Competitive Adsorption of Heavy Metal Ions from Aqueous Solution by Aminated Polyacrylonitrile Nanofiber Mats ....................................................... 142
Pinolpun Lampalanon, Prit Supaphol

Improved Light Harvesting in N719 Sensitized Nanocrystalline TiO2 Solar Cells with Coumarin 6 Dye ................................................................. 152
Pattarateya Kittiduchathan, Wichayapon Soonpanich, Badin Damrongsa

Characterization of Functionally Graded Polyurethane Elastomers ........................................... 157
Teerin Kongpun, Mutsuhisa Furukawa

ASEAN Energy Security: An Indicator-based Assessment ......................................................... 163
Kamphon Kunchana, Hisabouk Unekaki

Effect of Heat Treatment T6 on the Friction Stir Welded SSM 6061 Aluminum Alloys ............... 172
Worapat Boonchuayan, Jaknarin Chaitong, Sarasit Rawangwong, Romadorn Burapa

Preparation of Poly (methyl methacrylate) Microcapsule with Encapsulated Jasmine Oil ........ 181
Paweena Teeka, Amorn Chaiprayat, Preeyaporn Chaiprayat

Gold Nanoparticles-based Colorimetric Sensor for Cysteine Detection
Operation of Bench Plants Producing Racemic Lactic Acid and Lactide Isomers from Glycerol, a by-product of Biodiesel Fuel Production Process .......................................................... 187
Hisanori Kishida, Takashi Hasegawa, Takehiko Moriya, Hitomi Ohara, Nobuyoshi Nomura

Synthesis of Racemic Lactic Acid Using Glycerol By-product from Biodiesel Fuel Production Process as Feedstock .................................................................................. 195
Takashi Hasegawa, Nobuyoshi Nomura, Takehiko Moriya, Hitoshi Nishikawa, Syuhei Yamaguchi, Hisanori Kishida

Blend of Polypropylene/Poly(lactic acid) for Medical Packaging Application: Physicochemical, Thermal, Mechanical, and Barrier Properties .......................................................... 201
Nalin Ploypetchara, Panuwat Suppakul, Duangduen Atong, Chiravoot Pechyen

Particle Size of Ground Bacterial Cellulose Affecting Mechanical, Thermal, and Moisture Barrier Properties of PLA/BC Biocomposites ........................................................................... 211
Meechai Ludddee, Sommai Pivsa-Art, Sarote Sirisansaneeyakul, Chiravoot Pechyen

Accarat Chauomead, Varis Jithham

Long Cycle-life Organic Electrode Material based on an Ionic Naphthoquinone Derivative for Rechargeable Batteries ........................................................................................................ 228
Masaru Yao, Tatsuhiro Numoto, Miho Araki, Hisanori Ando, Hiroyuki T. Takeshita, Tetsu Kiyobayashi

Thermal Performance Testing of Heat Pipe Evacuated Tube with Compound Parabolic Concentrating Solar Collector by ISO 9806 - 1 .................................................................. 237
Wiwat Chamsa-Ard, Sukrudee Sukchai, Sorawit Sonsaree, Chatthai Sirisansanawong

Application of Multilayered Paper Processing to Hybrid Random Natural Fiber Mat ............................................................................................................................. 247
Takanori Kitamura, Kanta Ito, Suguru Teramura, Zhiyuan Zhang, Hiroyuki Hamada

Effect of Natural Rubber Contents on Biodegradation and Water Absorption of Interpenetrating Polymer Network (IPN) Hydrogel from Natural Rubber and Cassava Starch ................................................................ 255
Chaiwut Vudjung, Umaporn Chaiswan, Uraiwan Pangan, Nattiy Chaipugdee, Saiowaluk Boonyud, Onuma Santantwee, Sayanti Saengswan

Surface Modified CaCO3 by Palmitic Acid as Nucleating Agents for Polypropylene Film: Mechanical, Thermal and Physical Properties ........................................................................ 264
Arjaree Pradithham, Nathaporn Charisone, Suttisinee Puttajon, Duangduen Atong, Chiravoot Pechyen

Irradiated Oligochitosan against Colletotrichum Gloeosporioides in Chili ................................................................................................................................. 274
Prartana Kewswon, Sawitree Rujitanapanich, Thanit Bhasabutra, Vichai Puripunyawanich, Aporn Busamongkol, Uthaiwan Injaroen, Pipat Pichetpong

Development and Characterization of Poly (lactic acid)/Fish Water Soluble Protein Composite Sheets: A Potential Approach for Biodegradable Packaging ............................................. 280
Rapeepan Saiwaew, Panuwat Suppakul, Waraporn Boonsupthip, Chiravoot Pechyen

Mechanical Properties of Jute Composite by Spray up Fabrication Method ................................................................................................................................. 289
Tetsuo Kikuchi, Yuiichiro Tani, Yuka Takai, Akihiko Goto, Hiroyuki Hamada

Performance of Steam Production by Biomass Combustor for Agro-industry ................................................................................................................................. 298
B. Prasit, P. Manechotch

Optimization of Stand-alone PV-FC Hybrid System under Thailand Climate ................................................................................................................................. 309
Sukrudee Sukchai, Chatthai Sirisansanawong

The Synthesis of Cellulose Nanofibers from Sesbania Javanica for Filler in Thermoplastic Starch .............................................................................................................. 318
Surakit Kampongkaew, Chanchai Thongpin, Onuma Santantwee

Synthesis of Polydiacetylene Containing Copolyurethane Using Polyl Product Derived from Chemical Recycling of PET Bottles ................................................................................... 326
Pattamaporn Phuangpanumphan, Chanchai Thongpin

Influence of Ethylene Vinyl Acetate Contents on Properties and Crease Recovery of Slit Yarn from Polypropylene/High Density Polyethylene Blend ........................................................................... 334
Supaphorn Thumsorn, Natee Srisawat

Grid Connected based PWM Converter Applied a Self-excited Induction Generator for Wind Turbine Applications ........................................................................................................... 342
Satean Tungnirit, Chakrapong Charunth

Comparison the Economic Analysis of the Battery between Lithium-ion and Lead-acid in PV Stand-alone Application ................................................................................................. 352
Suratisawadee Anuphanpharakorn, Sukrudee Sukchai, Chatchai Sirisansanawong, Nipon Keerjo

The Effect of Average Photon Energy and Module Temperature on Performance of Photovoltaic Module under Thailand’s Climate Condition ....................................................................... 359
Chattanira Sirisansanawong, Nipon Keerjo, Chatchai Sirisansanawong
Investigations to Conduct a Study about Possibilities to Use Small Scale Solar Dish Stirling Engine System in Thailand

Effect of SiO₂ and TiO₂ Nanoparticles on the Performance of Dye- Sensitized Solar Cells Using PVDF-HFP/PVA Gel Electrolytes

Microwave Assisted Synthesis of Poly (Acrylamide-co-2-Hydroxyethyl Methacrylate)/Poly(Vinyl Alcohol) Semi-IPN Hydrogel

Simulation for the Management of Power Exchange and Payment between Renewable Energy and Electric Utility Network

Effect of Surface Treatment on the Properties of Pineapple Leaf Fibers Reinforced Polyamide 6 Composites

A Survey on RF Energy Harvesting: Circuits and Protocols

Effects of Nanoparticle Concentration and Plasticizer Type on Colorimetric Behavior of Polydiacetylene/Silica Nanocomposite as Time-temperature Indicator

Binary-additives Toughened Biopolymer for Packaging Application

Influence of Cutting Parameters in Face Milling Semi-solid AA 7075 Using Carbide Tool Affected the Surface Roughness and Tool Wear

Application of Ultrasonic Atomization for Biopolymer Particles and Tube Fabrication

Iron Oxide-based Supercapacitor from Ferratrane Precursor via Sol–gel-Hydrothermal Process

Performance Test of a Small Size LiBr–H₂O Absorption Chiller

Comparative Performance of Updraft-Gasified Gas Yields and Gasoline Fuel for Water Pumping

The Enhanced Performance SVC for Transient Instability Oscillation Damping

Evaluation of Carbon Footprint of Bioplastic Straw Compared to Petroleum based Straw Products

Design of Efficient In-Wheel Motor for Electric Vehicles

Effect of Weldline on Fatigue Life of Natural Rubber Parts

Duiran Peels Fiber and Recycled HDPE Composites Obtained by Extrusion

Rheological and Mechanical Properties of Recycled PET Modified by Reactive Extrusion

UV Photodetector based on Al-doped ZnO Nanocrystalline Sol-gel Derived Thin Films

Characterization of ZnO:Sn Nanopowders Synthesized by Co-precipitation Method
Study of the Solar Transmissivity of Plastic Cladding Materials and Influence of Dust and Dirt on Greenhouse Cultivations ............................................................................................................................... 566
Kiattisak Sangpradit

Design of Power Rectifier Circuit for Three-level Back-to-Back Converter .......................................................... 574
Nathabhat Phankong, Nawin Yuktanon, Krischonme Bhumkittipich

Study of Power Grid Connection with an Unstable Source from Elevator Energy Regenerative Unit (EERU) ............................................................................................................................... 584
A. Noppakant, B. Plangklang, Y. Paraken

Study of Power Generation for Permanent Magnet Motor Elevator by Energy Regenerative Unit (EERU) ............................................................................................................................... 591
Boonyang Plangklang, Sittichai Kantawong

Problems and Barriers on SHSs Management in Thailand's Rural Areas based on SWOT Analysis .......................... 598
Pimmnapat Iemsomboon, Nipon Tangtham

Design of a Bi-directional DC-DC 4 Phase Interleave Converter for PV Applications ........................................ 604
Saowanee Kanta, Boonyang Plangklang, Wanchai Subsingha

Load-side Voltage Compensation of Small Hydropower Grid-connected System Using DVR based on PV Source ............................................................................................................................... 610
Wathikrai Chanthamrian, Chakrit Winittham, Krischonme Bhumkittipich, Sontaya Manmai

A Study on Energy Efficiency Improvement Opportunities for Plug Loads in Buildings in the Equatorial Region ............................................................................................................................... 621
Qi Jie Kwong, Sind Hoi Goh, Nor Mariah Adam, Vijay R. Raghavan

Thermal Behavior of Vulcanized Deproteinized Natural Rubber Nano-composites .................................................. 634
Noppawan Pipattananukul, Warunee Ariyawiriyanan, Seiichi Kawahara

Effect of Modified Jute Fiber on Mechanical Properties of Green Rubber Composite ........................................ 641
Pruttipong Pantamanatsopa, Warunee Ariyawiriyanan, Tawatchai Meekeaw, Rattiyakorn Sathamyong, Ketika Arrub, Hiroyuki Hamada

Preparation of Biodegradable Polymer Copolyesteramides from L-Lactic Acid Oligomers and Polyamide Monomers ............................................................................................................................... 648
Sommai Pivsa-Art, Nichanan Phansroy, Wirunphat Thodresarapiyakul, Chatchavan Sukkaew, Weraporn Pivsa-Art, Supawan Lintong, Toungporn Dedgheng

An Off-line Battery Charger based on Buck-boost Power Factor Correction Converter for Plug-in Electric Vehicles ............................................................................................................................... 659
Wicharn Techitdheera, Jiravat Rattanarak, Wanichaya Mekprasart, Wisanu Pecharapa

C. Kahatttha, K. Chongsri, R. Noonuruk, W. Mekprasart, W. Pecharapa

Effect of Tin Loading on Physical Properties and Phase Transformation of as-synthesized Zn-Sn-O Compound Powders Synthesized by Co-precipitation Method ............................................................................................... 673
R. Rodprasert, T. Chandarasupsang, N. Chakpitak, P. P. Yopapin

Green Energy Community with Smart Society for Sustainable Living ........................................................................ 678
R. Rodprasert, T. Chandarasupsang, N. Chakpitak, P. P. Yopapin

Author Index