

Table of Contents

Preface

Chapter 1: Bio-Based Polymers and Composites

Study of the Potential Employment of Malvaceae Species in Composites Materials B.M.G. Guimarães, D. Cayuela Marín, W.F. Zonatti, W. Mantovani, C. Relvas, F. Cunha, R. Fangueiro, H. Savastano and J. Barque-Ramos	3
Smart and Sustainable Materials for Military Applications Based on Natural Fibres and Silver Nanoparticles D.P. Ferreira, S.M. Costa, H. Felgueiras and R. Fangueiro	14
Potential for Use of Veneer-Based Multi-Material Systems in Vehicle Structures D.B. Käse, G. Piazza, E. Beeh, H.E. Friedrich, D. Kohl, H. Nguyen, D. Berthold and C. Burgold	23
Preliminary Investigation on Improving Biopolymer Properties Using Nanocellulose from Tropical Forest Species S. Adnan, T. Khadiran, L. Jasmani and R. Rusli	29
Use of Simulation to Enhance the Performance of Sustainable Bio-Based Polyurethane Foam R.M. Raouf, H.A. Abdalgane and R.S. Al-Jadiri	35
Recent Advances in Bio-Based Sustainable Aliphatic and Aromatic Epoxy Resins for Composite Applications S. Sathyaraj and K. Sekar	42
Tensile Properties of Unidirectional Kenaf Polypropylene Composite at Various Temperatures and Orientations D. Tholibon, A.B. Sulong, N. Muhamad, I. Tharazi, N.F. Ismail and D.A. Tholibon	53
Unidirectional Kenaf Polypropylene Composites: Optimization Process by Two Level Full Factorial D. Tholibon, A.B. Sulong, N. Muhamad, N.F. Ismail, I. Tharazi and M.K.F. Md Radzi	57
Water Sorption of Vegetable Fiber Reinforced Polymer Composites L.H. de Carvalho, A.G. Barbosa de Lima, E.L. Canedo, A.F.C. Bezerra, W.S. Cavalcanti and V.A.D. Marinho	61
Experimental Strength of Woven Fabric Kenaf Composite Plates with Different Stacking Sequences H. Ahmad and K. Supar	68
Evaluation of the Performance of the Composite Bamboo Yacht Material X.D. Huang, S.H. Zhuan, J.K. Huang, C.Y. Hse and T.F. Shupe	74
Mechanical Properties of New Sustainable Polymeric Formulations for Rotomoulding Processes A. Martínez-García, A. Ibáñez-García and F.J. Varela-Gandía	84
Sustainable Fabrication Technology of Composite Board by Kenaf-Polypropylene for Automobile Door Interior Applications L. Anggraini and A. Anjany	90
Microstructure of Thermoplastic Composites Reinforced with Wool and Wood C. Baptista, G. Martins, C. Santos, A. Mateus and F. Antunes	96
Tensile and Flexural Properties of Untreated Sisal Fibers Reinforced Unsaturated Polyester Resin Composites S.C.C. de Souza, I.C.B. Vieira, I.F. Barbosa, N.F.T.G. Leão, A.C.B. Zancanella, R. Maziero, B.D. de Castro and J.C.C. Rubio	111
Optimal Use of Industrial Hemp for PLA Biocomposite and LLDPE Composite Reinforcement A. Smoca and Z. Zelca	117
Development of Plywood Binder by Partial Replacement of Phenol-Formaldehyde Resins with Birch Outer Bark Components A. Paze, J. Rizhikovs, D. Godiņa, R. Makars and R. Berzins	125
Study of an Appropriate Suberic Acid Binder for Manufacturing of Plywood A. Paze and J. Rizhikovs	131

Short Review: Potential Production of Acacia Wood and its Biocomposites

M.K. bin Bakri, E. Jayamani, K.H. Soon and A. Kakar

136

Chapter 2: Materials for Energy Storage and Conversion Technologies**Effect of Particle Size on the Physical Properties of Activated Palm Kernel Shell for Supercapacitor Application**

R.T. Ayinla, J.O. Dennis, H.B.M. Zaid, F. Usman and A. Yar

143

Optimization of Dye Extraction from Purple Cabbage and Cordyline Fruticosa in Dye-Sensitized Solar Cell

A.K. Rosli, S. Suhami, M.A. Hashim@Ismail, N.M. Yatim and N. Hamid

148

Carbon Nanosheet Frameworks Derived from Pine Cone Shells as Sodium-Ion Battery Anodes

F.Y. Hu, S.Y. Liu, J.Y. Wang, S.M. Li and X.G. Jian

157

Hydrothermal Synthesis of Binder-Free Kapok (*Ceiba pentandra*) Fiber Paper-NiCo₂O₄ Supercapacitor Electrode

K.C. Fermano and M.D.L. Balela

166

The Interconnected Open-Channel Highly Porous Carbon Material Derived from Pineapple Leaf Fibers as a Sustainable Electrode Material for Electrochemical Energy Storage Devices

S. Kingsakklang, S. Roddecha and M. Sriariyana

172

Chapter 3: Organic Corrosion Inhibitors, Coatings and Lubricants**Austenitic 316L Stainless Steel; Corrosion and Organic Inhibitor: A Review**

M.A. Fajobi, R.T. Loto and O.O. Oluwole

183

Comparison of the Protection Performance of Calcifon and Rosmarinus Officinalis on Low Carbon Steel Corrosion in Petrochemical Drilling Fluid

R.T. Loto

190

The Synthesis and Surface Properties of Newly Eco-Resin Based Coconut Oil for Superhydrophobic Coating

N. Marsi, A.Z.M. Rus, I. Mohd Razali, S.A. Samsuddin and A.H. Abdul Rashid

198

Tribological Evaluation on Various Formulation of Modified RBD Palm Olein as Sustainable Metalworking Fluids for Machining Process

E.A. Rahim, N. Talib, A.S. Abdul Sani, S. Syahrullail and Z. Mohid

203

Chapter 4: Materials Based on Organic Waste**Grass Waste Derived Cellulose Nanocrystals as Nanofiller in Polyvinyl Alcohol Composite Film for Packaging Application**

D. Wan Hazman, R.M. Taib, M.A.A. Samah and Z.A. Majid

211

Design and Research of Eco-Friendly Polymer Composites

V. Lebedev, T. Tykhomirova, I. Litvinenko, S. Avina and Z. Saimbetova

219

Can European Sea Bass (*Dicentrarchus labrax*) Scale Be a Good Candidate for Nano-Bioceramics Production?

Y.M. Sahin, O. Gunduz, A. Ficai, N. Eken, A. Tuna, A.T. Inan and F.N. Oktar

227

The Influence of Mechanical and Mechanochemical Activation of Hardwood Wood Waste on Biocomposite Properties

J. Jaunslavietis, G. Shulga, J. Ozolins, B. Neiberte, A. Verovkins, S. Vitolina and V. Shakels

233

Synthesis of Sustainable and High Purity of Quicklime Derived from Calcination of Eggshell Waste in a Laboratory-Scale Rotary Furnace

S. Chuakham, A. Putkham, A.I. Putkham and S. Kanokwan

238

Chapter 5: Materials Based on Inorganic Waste**Utilization of Fly Ash in the Synthesis of Refractory Forsterite-Spinel Ceramics**

M. Nguyen and R. Sokolov

249

Preparation of SiO₂-Na₂O-CaO-P₂O₅ Glass-Ceramic from Waste Materials and Heat Treatment Effects on its Morphology	
N.F.B. Pallan, K.A. Matori, M. Hashim, W.F. Lim, H.J. Quah, A.N. Fauzana, N. Rosnah, M.Z.A. Khiri, S. Farhana, N. Zainuddin, N.A. Zarifah, M. Nurzilla, M.Z.M. Hafiz, C.W. Loy and M.I.M. Zamratul	259
Influence of Fly Ash Addition in the Raw Mixture on Synthesis and Properties of Forsterite	
M. Nguyen and R. Sokolař	263
Development of Composite Using Recycled PET Reinforced with Fiberglass Powder, Sawdust and Gypsum	
A. Mathu, S.A. Asif, K. Chandra, S. Motru, D. Patel and R. Syed	269
Novel Bio-Based Composites Panels from TetraPak Waste	
A. Hassanin and Z. Candan	275
A Study on Acoustic Property of Composites from Waste Tyres	
B.P. Jena, A. Jagdev, B.B. Nayak and S. Satapathy	280
Novel Sustainable Composites with Geopolymeric Steel Slag and Recycled from Packing PET	
E.M. Santos, A.V. Gomes, F.J.H.T.V. Ramos and S.N. Monteiro	288
Synthesis of Spinel Color Pigments from Aluminum Dross Waste	
N. Yongvanich, B. Emtip, B. Hengprayoon and E. Jankat	294
Effect of Borax on Lightweight Material from Cullet and Fly Ash	
S. Sriprasertsuk, P. Suwannason and W.T. Saengchantara	300