

Table of Contents

Preface

Chapter 1: Properties and Processing of Metal Materials

Effects of Laser Power and Scanning Speed on the Microstructural Evolution and Hardness of AlCrFeNiMn HEAs Fabricated via Laser Cladding P. Mpofu, N. Malatji, M.B. Shongwe and L.R. Kanyane	3
Taguchi Optimization of MRR in Magnesium AZ91 Using EDM with Graphite Electrode P. Nakwong and A. Muttamara	11
Influence of Casting Parameters on the Nodule Count in Ultrafine Spheroidal Graphite Iron W. Boonyarat, W. Waenthongkam, K. Amatachaya, N. Wanmai, K. Worakut and S. Boonmee	17
Consistency of Microstructure and Mechanical Properties of Carbon Steel Manufactured by Wire Arc Additive Manufacturing with Different Production Systems T. Rautio, M. Hietala, A. Abdelghany and A. Järvenpää	25
Estimation of Main Technological Parameters for Equal Channel Angular Pressing Technique Design N.D. Khoa and P.Q. Trung	33
Corrosion and Oxidation Behaviour of Ti-Al Based Alloys Synthesized via Laser <i>In Situ</i> Alloying L.R. Kanyane, A.P.I. Popoola and N. Malatji	39
The Occurrence of Titanium Carbide in Ti-Alloyed Gray Iron K. Worakut, A. Wanalerkngam, W. Boonyarat, K. Amatachaya, N. Wanmai, K. Sriboonrueang and S. Boonmee	45
Effect of Inhomogeneous Oxygen Distribution on Martensitic Transformation of β Phase in Ti-15at%Nb-1at%O Alloy S. Kobayashi, M. Kobayashi, T. Nakae and S. Okano	51

Chapter 2: Friction Stir Welding of Alloys

Development of Numerical Model for the Rotary Friction Welding Process Using Aluminum Alloy P.Q. Trung, D.D. Khoa and N.G. Lam	63
Rotary Friction Welding of AA6061 Aluminum Alloy: An Experimental and Simulation Investigation P.Q. Trung, D.D. Khoa and N.G. Lam	69
Numerical Modelling of Temperature Distribution and Defect Prediction during Friction Stir Welding of Aluminum Alloy P.Q. Trung and L.D. An	75
Experiment Design and Process Optimization for Aging Friction Stir Welds in 6061 Aluminum Alloy B.D. Khanh, P.Q. Trung and D.D. Qui	81
Appropriate Parameters for Preheat Friction Stir Welding of 6061-T6 Aluminum Alloys Using Taguchi Method A. Baisukhan, N. Wisittipanit, W. Nakkiew and P. Siriwat	87
Surface Structure and Strength Analysis of Friction Stir Welding in Thin Sheet Dissimilar Magnesium Alloys S.P. Yu, C.M. Cheng and Y.Z. Xiao	93

Chapter 3: Composites and Polymers

A Comparison Analysis on Mechanical Properties between 355 μm Bamboo Fiber, Chopped Strand Mat and Epoxy Hybrid Composite versus 500 μm Bamboo Fiber, Chopped Strand Mat and Epoxy Hybrid Composite K. Rassiah, A. Ali and M.Z. Hussein	101
---	-----

Opportunities of Coir as a Reinforcement for Natural Fiber Composites as Fishing Boat Wall Materials	109
M. Arsyad, A. Haya and A. Nurul Muttaqin	
Investigating Water Absorption Characteristics of Sisal and Glass Fiber Reinforced Composites: Effects of Stacking Sequence on Moisture	115
M. Barman, V. Sharma, A. Marbaniang, S. Samanta, N.K. Rana and N. Teyi	
Natural Rubber-Based Thermal Insulation Foams: Physical, Mechanical and Heat Insulation Properties	121
S. Tuampoemsab, A. Rattanapan, P. Sapsrithong, T. Sritapunya, S. Wongmanee and T. Sopakitiboon	
Effect of a Low Corn Silk Flour Loading in Polybutylene Succinate Biocomposites on Degradability under Soil Burial and Sunlight Exposure Conditions	129
T. Sritapunya, A. Rattanapan, P. Sapsrithong and S. Tuampoemsab	
Design and Development of Bi-Axial Testing Fixture	137
N.H. Dang	
Alloy 625+TiB₂ Composites Fabricated via Suction Casting – Microstructure and Selected Properties	145
Ł. Rakoczy, K. Pajor, D. Kozień, M. Grudzień-Rakoczy and R. Cygan	

Chapter 4: Functional Materials and Special Coatings

Direct Integration of Iron Oxide Nanoparticles on Bacterial Cellulose for Dye Degradation in Water	153
M.L.M. Budlayan, J.N. Patricio, D.C. Palangyos, R.A. Guerrero and S.D. Arco	
Investigating the Effect of HCl Pre-Treatment and Single Step Impregnation-Activation Carbon of K₂FeO₄- KOH Catalyst on the Graphitization Process of Empty Palm Oil Fruit Bunches	161
I. Nuriskasari, A.Z. Syahrial, T.A. Ivandini, A. Sumboja, B. Priyono and Q.Y. Yan	
Aniline Tetramer Decorated Fluoroacrylate Polymers as High-Performance Corrosion Resistance Coatings	167
Z.H. Shen, M.Y. An, Q.Q. Hu and Q. Xiao	
Optical Characteristics of Antireflective Materials Based on Polymers with Carbon Nanomaterials	173
M.N. Zhukava and F.F. Komarov	
Electrowetting Behavior of Water Microdroplets on a Natural Superhydrophobic Leaf and its Elastomeric Replica	181
M.L.M. Budlayan, D.C. Palangyos, J.N. Patricio, S.D. Arco and R.A. Guerrero	
Characteristics of NMC811 after Surface Modification Using Rice Husk Derived Silica Coating	187
F. Angellinnov, A. Subhan, T.A. Ivandini, A. Sumboja, B. Priyono, Q.Y. Yan and A.Z. Syahrial	

Chapter 5: Materials for Biomedical Applications

Effect of Oxygen Partial Pressure in Heat Treatment Atmospheres on Wettability of Titanium Surface	195
S. Okano, K. Nisogi, T. Tsurumi, S. Kobayashi and K. Kuroda	
Effect of Solution Treatment on Mechanical and Corrosion Properties of Ti-6Al-7Nb Alloy in Biomedical Applications	205
A.U. Saudi, M. Wibisono, S.A. Azahra, G. Taqwatomo, W. Rianti, D. Damisih, A. Agustanhakri, M. Kozin, S. Suryadi, I.N. Jujur, I. Setyadi, B. Tri Wibowo, M.D. Gumelar, J. Sah and N. Suhendra	
Performance Assessment: Chitosan Zinc Nanocomposites versus Hydrogel Nanocomposites for Enhanced Biological Applications	215
K. Vaidhegi, F. Thabares and V. Muthukumar	
Blend Optimization of Gum Arabic/Citric Acid Bioadhesive for Wound Dressing Applications	221
T. Tumolva, G. Franza, R.A. Limbo and M.L. Llaneta	

Development and Kinetic Evaluation of PLA/NCC Nanofilms: A Comparative Study of Gelatin and Starch for Effective Drug Delivery System

A.N. Salim Salmi, N. Abdullah, N.H. Sa'adin, N.A.M. Salpini and M.H. Syed

227

Chapter 6: Industrial Engineering and Technological Innovations

Innovative Strategies for High-Efficiency, Low-Cost, Lightweight III-V Multijunction Solar Cells

B.M.Y. Jeco-Espaldon

235

Design and Fabrication of a Small-Capacity Integrated Filling, Capping, and Labeling Machine for Bottles

P.Q. Trung

241

Fabrication of Plant-Based Customized and Nutritious Foods by Food Layered Manufacturing (FLM)

R. Soni, K. Ponappa and P. Tandon

247