

# Table of Contents

## Preface

## Chapter 1: Properties of Structural Metals and Alloys

<b>Using Strain Energy Method to Estimate Buckling in Steel Column AISI 1312 during Effects of Fire Hazard</b> A.H. Fahem and M.N. Hawas	3
<b>Enhancing the Oxidation Behavior of Zr-Modified Aluminide Coatings on Inconel 600 at Different Temperatures</b> N.M. Dawood and A.M. Salim	17
<b>Effect of Oxidation on the Transformation Temperatures and Microstructure of Ti-Ta-Al High Temperature Shape Memory Alloys</b> Z.T. Khulief and H.F. Mahdy	27
<b>Structural Characterization and Mechanical Properties of Ductile Iron - Enhanced Alloyed Ductile Iron</b> A.A. Mnati, K.K. Resan and E. Omaraa	37

## Chapter 2: Technologies of Materials Processing

<b>Impact of CNC Milling Parameters on Temperature, Surface Roughness, and Chip Formation of General Purpose PMMA</b> J.M. Wambua, F.M. Mwema, T.C. Jen and E.T. Akinlabi	49
<b>Analysis of the Multi-Directional Forging of Aluminium Alloy 7075 Process Parameters: Numerical and Experimental Analysis</b> C. Obara, F.M. Mwema and T.C. Jen	61
<b>Micro Forming and its Applications: An Overview</b> S.K. Sharma, B.K. Kodli and K.K. Saxena	73
<b>The Influence of Material Position towards the Bending Strength of the 4 Pass AA1050/AA6082 and AA6082/AA1050 FSPed Joints</b> O. Muribwathoho, V. Msomi and S. Mabuwa	93
<b>Wear and 3D Micro-Morphological Studies on CAD/CAM Milled Dental Zirconia for Post-Fabrication Dental Processes</b> A. Patil, J.D. Davidson, J.M. Jafferson, V. Gopal and G. Manivasagam	105
<b>Role of Additive Manufacturing in Development of Forming Tools and Dies for Sheet Metal Forming: A Review</b> B. Singh	119
<b>Design and Fabrication of Injection Molds to Manufacture Double Channel Laryngoscope for Effective Airway Management: Taguchi Method for Surface Roughness Optimization</b> B. Shetty, J.S. Reddy, A. Lakshmikanthan, P.G.C. Manjunath and V. Malik	129
<b>A Review of Magnesium Based MMC Fabrication Techniques for Biomedical Applications</b> P. Sonia, J.K. Jain and K.A. Mohammed	141

## Chapter 3: Materials and Technologies for Energy Storage and Conversion Devices

<b>Experimental and Numerical Analysis of Low Temperature Proton Exchange Membrane Fuel Cell (PEMFC) with Different Fuel Flow Rate in Improving Fuel Cell Performance</b> Y.D. Herlambang, Kurnianingsih, A. Roihatin, T. Prasetyo, Marliyati and F. Arifin	153
<b>A Novel Synthesis of Cathode Material <math>\text{NaNi}_{0.5}\text{Ti}_{0.5}\text{O}_2</math> for Sodium-Ion Batteries</b> A.R. Nurohmah, K.N.R. Stulasti, W.G. Suci, K. Aliwarga and A. Purwanto	167

## **Chapter 4: Water Treatment**

### **Synthesis and Characterization of PVDF/Graphene Nanocomposite Membrane for Water Treatment Applications**

S. Rao, A. Lakshmikanthan, A.S. Sowmyashree, C. Hegde, A.M. Isloor and V. Malik 177

### **The Mechanism of Adsorbents Adsorption Affinity in Relation to Geometric Parameters**

S. Ntsondwa, V. Msomi and M. Basitere 189

## **Chapter 5: Building Materials**

### **An Eco-Sustainable Production of Cement Mortar Containing Waste Glass as Partial Replacement of Cement**

K.K. Aswed and I.K. Harith 201

### **Effect of Proposed Accelerated Curing Method on High Volume Fly Ash Concrete**

I.K. Harith, B.H. Amanah and M.H. Naser 213

### **Effect of Elevated Temperature on the Physical and Mechanical Properties of Crushed Clay Bricks Aggregate Concrete**

A.M. Almusawi, R. Shabbar and Q.A. Jabal 223

### **Study some Mechanical and Thermal Properties of reinforced Perlite Concrete**

R.S. Al-Jadiri, M.A. Al-Wahab Ali and Q.J. Frayyeh 233

### **Estimated Fatigue Life of Recovery Reclaimed Asphalt Pavement Binder**

A.H.A. Al-Haddad 243

### **Suitable Ultra-Thin Asphalt Binder Achieved the Energy Equilibrium**

Y.H. Abed and A.H.A. Al-Haddad 257