Table of Contents

Preface

Chapter 1: Polymers and Composites

from Alpha Dartialas	
from Alpha Particles Z.S. Karim and M.S. Aswood	3
Studying the Critical Buckling Load of FG Beam Using ANSYS K.S. Ateah and L.S. Alansari	7
Improvement of Buckling Behavior of Composite Plates Reinforced with Hybrids Nanomaterials Additives	
M. Al-Waily, M.J. Jweeg, M.A. Al-Shammari, K.K. Resan and A.M. Takhakh Improvement and Optimization of the Hardness for the Aluminum Metal Matrix	23
Composite Using Eggshell W.T. Rashid and K. Rashid	42
Characterization of Natural Rubber (NR), Polybutadiene Rubber (BR) and Styrene-Butadiene Rubber (SBR) Blends Cured in a Vulcanization System M.J. Jweeg and Z.G.A. Al-Jlaihawi	51
Effects of Core Height, Cell Angle and Face Thickness on Vibration Behavior of Aircraft Sandwich Structure with Honeycomb Core: An Experimental and Numerical Investigations M.J. Jweeg, S.H. Bakhy and S.E. Sadiq	65
Effect of Laser Surface Heat Treatment on Wear and Hardness Resistance of Metal Matrix Composite from (Al- 6061+ SiC Particles) M.Z. Hasan, M.A. Mohammed and I.E. Yousif	86
Production Ceramic Crude Petroleum Filters from Local Raw Materials	80
H. Jabbar, E. Muhi and T. Hussien	96
Synthesis Structural and Optical Properties of CMC/MgO Nanocomposites Y.M. Jawad, M.F.H. Al-Kadhemy and J.A.S. Salman	104
Chapter 2: Properties and Processing Technologies of Steel and Alloys	
Optimization the Machining Parameters of Electro Chemical Discharge Machining of NiTi Shape Memory Alloys	
Shape Memory Alloys S.A. Hammood, H.A.H. Al-Ethari and A. Rahimi	117
Shape Memory Alloys	117 127
Shape Memory Alloys S.A. Hammood, H.A.H. Al-Ethari and A. Rahimi The Computational Fluid Dynamics Investigation on the Solidification of Aluminum Cast in Moulds with Different Thickness and the Influence of the Moderate Press	
Shape Memory Alloys S.A. Hammood, H.A.H. Al-Ethari and A. Rahimi The Computational Fluid Dynamics Investigation on the Solidification of Aluminum Cast in Moulds with Different Thickness and the Influence of the Moderate Press Z.K. Ghoben, K. Al-Farhany and M.Q. Kareem Incremental Forming of AA8006 Aluminum Alloys Sheet with Different Step Size A.M. Obaid, J.S. Chiad and G.S. Sadiq Resistance Spot Welding of Dissimilar Alloys 1008 Low Carbon Steel- 1100 Aluminum	127
Shape Memory Alloys S.A. Hammood, H.A.H. Al-Ethari and A. Rahimi The Computational Fluid Dynamics Investigation on the Solidification of Aluminum Cast in Moulds with Different Thickness and the Influence of the Moderate Press Z.K. Ghoben, K. Al-Farhany and M.Q. Kareem Incremental Forming of AA8006 Aluminum Alloys Sheet with Different Step Size A.M. Obaid, J.S. Chiad and G.S. Sadiq Resistance Spot Welding of Dissimilar Alloys 1008 Low Carbon Steel- 1100 Aluminum Alloy H.K. Jabber and E.J. Al-Shaibani	127
Shape Memory Alloys S.A. Hammood, H.A.H. Al-Ethari and A. Rahimi The Computational Fluid Dynamics Investigation on the Solidification of Aluminum Cast in Moulds with Different Thickness and the Influence of the Moderate Press Z.K. Ghoben, K. Al-Farhany and M.Q. Kareem Incremental Forming of AA8006 Aluminum Alloys Sheet with Different Step Size A.M. Obaid, J.S. Chiad and G.S. Sadiq Resistance Spot Welding of Dissimilar Alloys 1008 Low Carbon Steel- 1100 Aluminum Alloy	127 137
Shape Memory Alloys S.A. Hammood, H.A.H. Al-Ethari and A. Rahimi The Computational Fluid Dynamics Investigation on the Solidification of Aluminum Cast in Moulds with Different Thickness and the Influence of the Moderate Press Z.K. Ghoben, K. Al-Farhany and M.Q. Kareem Incremental Forming of AA8006 Aluminum Alloys Sheet with Different Step Size A.M. Obaid, J.S. Chiad and G.S. Sadiq Resistance Spot Welding of Dissimilar Alloys 1008 Low Carbon Steel- 1100 Aluminum Alloy H.K. Jabber and E.J. Al-Shaibani Simulation Upper Bound Theorem to Prediction Extrusion Load A.A. Taher Investigation into the Distribution of Erosion-Corrosion in the Furnace Tubes of Oil Refineries	127 137 144 159
Shape Memory Alloys S.A. Hammood, H.A.H. Al-Ethari and A. Rahimi The Computational Fluid Dynamics Investigation on the Solidification of Aluminum Cast in Moulds with Different Thickness and the Influence of the Moderate Press Z.K. Ghoben, K. Al-Farhany and M.Q. Kareem Incremental Forming of AA8006 Aluminum Alloys Sheet with Different Step Size A.M. Obaid, J.S. Chiad and G.S. Sadiq Resistance Spot Welding of Dissimilar Alloys 1008 Low Carbon Steel- 1100 Aluminum Alloy H.K. Jabber and E.J. Al-Shaibani Simulation Upper Bound Theorem to Prediction Extrusion Load A.A. Taher Investigation into the Distribution of Erosion-Corrosion in the Furnace Tubes of Oil Refineries M.J. Jweeg, K.I. Mohammed, M.H. Tolephih and M. Al-Waily The Effect of Electrical Discharge Machining Total Heat Generated on White Layer Thickness (WLT) and Fatigue Life for Die Steel	127 137 144 159
Shape Memory Alloys S.A. Hammood, H.A.H. Al-Ethari and A. Rahimi The Computational Fluid Dynamics Investigation on the Solidification of Aluminum Cast in Moulds with Different Thickness and the Influence of the Moderate Press Z.K. Ghoben, K. Al-Farhany and M.Q. Kareem Incremental Forming of AA8006 Aluminum Alloys Sheet with Different Step Size A.M. Obaid, J.S. Chiad and G.S. Sadiq Resistance Spot Welding of Dissimilar Alloys 1008 Low Carbon Steel- 1100 Aluminum Alloy H.K. Jabber and E.J. Al-Shaibani Simulation Upper Bound Theorem to Prediction Extrusion Load A.A. Taher Investigation into the Distribution of Erosion-Corrosion in the Furnace Tubes of Oil Refineries M.J. Jweeg, K.I. Mohammed, M.H. Tolephih and M. Al-Waily The Effect of Electrical Discharge Machining Total Heat Generated on White Layer	127 137 144 159

Chapter 3: Synthesis of Nanoparticles

Synthesis and Characterization of ZnO Nanoparticles via Aloe Vera Extract Z.K. Alkaabi	211
Optical and Morphological Properties of Silver Nanoparticles Synthesis by Q-Switched Nd-YAG Laser	
N.F. Khdr, B.G. Rasheed and B.M. Ahmed	215
Synthesis of Environmentally Friendly Silver Nanoparticles M.A. Hussein, S.H. Trier and S.A. Kadhim	225
Preparation and Study Optical Limiting of Gold Nps by Pulsed Laser Ablation in Distilled Water (DDDW) Z.F. Khudhair and R.S. Alnayli	230
Functionalization of Multi-Walled Carbon Nanotubes Using Microwave Method F.K.M. Alosfur, N.J. Ridha, M.H. Haji Jumali, S. Radiman, K.J. Tahir, H.T. Hadi, R.A. Madlol and N. Al-Dahan	237
Investigations on the Nonlinear Optical Properties of Eu ³⁺ : TiO ₂ Nanoparticles via Z-Scan Technique	
B.A. Jabbar, K.J. Tahir, B.M. Hussein, H.H. Obeed, N.J. Ridha, F.K.M. Alosfur and R.A. Madlol	245
Chapter 4: Functional and Special Materials	
Enhanced Thermoelectric Properties of the Zn _{1-x} Cd _x Sb Prepared by Solid State Microwave Synthesis	
A. Kadhim	255
The Role of Formic Acid as Secondary Dopant and Solvent for Poly(O-Toluidine) Intrinsically Doped with Camphor Sulfonic Acid	• 60
K.A. Mohammed, K.M. Ziadan, A.S. Al-Kabbi, D.S. Abdulzahr, H.K. Judi and H.M. Hussein	260
Studying the Physical Properties of Bi-2223 Nanostructure Prepared Thermal Treatment Method Z.K. Alkaabi and E.K. Al-Shakarchi	269
Experimental Validation of Phase Change Material Cooling Performance Integrated into	
Finned Heat Sink H.S. Mahdi, J.M. Jalil and A.S. Allawy	274
Enhancing Thermal Properties of Steam Turbine Blades by Coating with Nanomaterials A.A. Ugla, M.I. Hasan, Z.A. Ibrahim and D.J. Kamil	281
The Effect of Nanostructured Zirconia Reinforcement on the Mechanical and Structural Properties of a Copper-Based System A.S.H. Karim, Z.N. Majeed and S.Y. Darweesh	297
The Effect of Ethanol Solvent on Characterization of MAPbI ₃ Perovskite	271
M.M. Abood, O.A.A. Dakhil and A.S. Baron	307
Preparation of Solid-Super Acidic Catalyst with Improvement Physical Properties S.A.S. Kamel, H.A. Al-Jendeel and W.T. Mohammed	313
Preparation and Characterization of (CO ₃ O ₅ , Fe ₂ O3: Sn) Nanocomposite for Sensitize Photoelectrodes H.J. Mohammed	326
Optical Properties of Non-Crystalline Fluorine Doped Hematite Fe ₂ O ₃ Thin Films Deposited by Chemical Spray Pyrolysis Technique	
A.H.O. Alkhayatt, A.A. Habeeb and N.F. Ali	332
Chapter 5: Materials for Opto- and Microelectronics	
Red Laser Irradiation Effect on the Structural Properties of MawsoniteCu ₆ Fe ₂ SnS ₈ [CFTS] Thin Films Deposited via Semi-Computerized Spray Pyrolysis Technique B.T. Chiad, M.T. Al-Helaly and N.A. Al-Tememee	343
Enhanced UV Absorption and Low Energy Gap of Polymer Doped ZrO ₂ - SiC NPs	
A.M. Nattah and A. Hashim	357

Theoretical Investigation of Electronic Transfer Rate for Au Metal Contact with Bathocuproine BCP Dye	
H.J.M. Al-Agealy, S.S. Al-Obaidi and S.R. Abbas	363
An Investigation of the Fill Factor and Efficiency of Molecular Semiconductor Solar Cells T.S.A. Maadhde, M.H. Jumali, H.J.M. Al-Agealy, F.B.A. Razak and C.C. Yap	373
Effect of Cd Substitution on Structural and Optical Properties of $\mathbf{Zn}_{1-x}\mathbf{Cd}_x\mathbf{Se}$ Thin Films A. Kadhim, M. Kadhim and H.A. Hassan	382
DFT Study of Chemical Adsorption of NO ₂ Gas on Graphene Nano Material M.A. Al-Seady, N.A. Abdul Wahhab, H.I. Abbood and H.M. Abduljlil	391
Compositional, Structural and Morphological Analyses of Bulk GeS Alloy and its Thin	
Films M. Al-Haji and R.M.S. Al-Haddad	398
Employment of DC Sputtering for Synthesizing Nano Cadmium Oxide for Sevoflurane Anesthetic Gas Sensor	40.6
A.S.J.M. Al-Ragehey, O.A.A. Dakhil, H. Saadoun, A.H. Mohammed and M. Hassan	406
Concentration Effects on Characteristics of Gas Sensors Based on SnO ₂ :Sb ₂ O ₃ Thin Films R.M. Aljarrah and A.M. Aljawdah	416
Study of the Effect of Solvent Polarity on Transitions of Absorption and Fluorescence Spectrum of a Erythrosine Dye	426
A.A. AL-Ramahy Synthesis and Characterization of Chemically Sprayed Cu ₂ FeSnS ₄ (CFTS) Thin Films: The Effect of Substrate Temperature	420
M.A. Abed, N.A. Bakr and S.B. Mohammed	434
Noble Metal Thin Film Thickness Optimization for Sharp Surface Plasmon Resonance Reflectance Curve	
H.D. Awad, M.K. Khalaf and A.N. Abd Algaffar	442
Theoretical Investigation in Coherent Manipulation throughout the Calculation of the Local Density of States in FM-DQD-FM Device	451
M.A. Najdi, J.M. AL-Mukh and H.A. Jassem	431
Chapter 6: Biomaterials	
The Mechanical Properties of the Lower Limb Socket Material Using Natural Fibers: A Review	
S.A. Mechi, M. Al-Waily and A. Al-Khatat	473
Effect of SiO ₂ and Al ₂ O ₃ Hybrid Nano Materials on Fatigue Behavior for Laminated Composite Materials Used to Manufacture Artificial Socket Prostheses	
N. Dakhel, A.A. Kadhim, R.H. Al-Khayat and M. Al-Waily	493
Production of Porous Bioactive Glass (13-93)/Poly Ethylene Glycol Composite Scaffold for Bone Tissue Defects	71 0
Z.I. Dhary, S.B.H. Farid and A.A. Atiyah	510
Boosting Mechanical Properties of Orthoses - Foot Ankle by Adding Carbon Nanotube Particles	<i>5</i> 10
A.H. Jeryo, J.S. Chiad and W.S. Abbod Neuronal Toxicity of CdS Nanoparticles Prepared by Laser Ablation and their Effect on	518
Liver N.K. Mahan, M.A.M. Hassan, A.H. Mohammed and R.I. Khalee	537
Investigation on Biocompatibility and Mechanical Properties of Ti15Mg Alloy	
H.A.H. Al-Ethari, S.A. Jasim and E.K. Zamel	557