

Table of Contents

Preface

Chapter 1: Advanced Semiconductors

Machine Learning Prediction of Optical Absorption in GaAs 2D Nanostructure under Hydrostatic Pressure

I. Lamrini, M. Hbib, S. Chouef, M. El Hadi, R. Boussetta, O. Mommadi, A. El Moussaouy, K. Laabidi and C.A. Duque 3

Influence of Nonlinear Crystal Properties on Entanglement Generation in Spontaneous Parametric Down-Conversion (SPDC) Sources

H. Chakir, F. Abdi and F.M. Abbou 15

Investigation by First-Principles Calculation of the Structural and Electronic Properties of Hexagonal SrLiP

B. Nihad, B. Mounaim, D. Zakariae, F. Falyouni and L. El Farh 25

Recent Stable Semiconducting SiC Nanocluster for Protecting Soft Metals in Energy Conservative Systems: A Quantum Chemistry Analysis

F. Mollaamin and M. Monajjemi 31

Chapter 2: Alloys and Steels

Formation Enthalpy and Phase Behavior of Fe–Al–Ni Alloys: A Thermodynamic and Theoretical Spectroscopic Study

F.H. Jabar and A.K. Alsaedi 57

Failure Mechanisms and Shunt Effect Phenomenon in Single- and Double-Nugget Resistance Spot Welded HSLA Steel

H.H. Khaleel, I. Mahmood and F. Khoshnaw 73

Chapter 3: Functional and Special Materials

Observation of the Effect of Periodic Vibration on the Phase Transition of VO₂ Thin Film

S. Azad, D. Gajula, M.H. Prio and G. Koley 91

Dual Solutions and Temporal Stability of MHD AlO–Cu/Water Hybrid Nanofluid Flow over a Bidirectional Shrinking Sheet in a Porous Medium

A.R. Mohd Kasim, S.M.H. Mohd Kanafiah, A.T. Adeosun, N.A.N. Ariffin and N.A. Zainal 97

Revisiting the Viscoelastic Theory of Superionic Conductor Ag_{2+δ}Se and its Implication to Thermoelectric Materials

M. Aniya 105

Chapter 4: Polymers and Composites

Characterization of Polymer Composites Reinforced with Metal Particles

M. Mátyus, D. Mentés, B. Fiser and T.J. Szabó 113

Crystallinity Transformation in Pulverized Polyphthalamide for Sustainable Polymer Engineering

Y. Yekymov and V. Lebedev 127

Application of Timoshenko Beam Theory in Finite Element Simulation of Fiber-Reinforced Composite Material

L.J. Mónus and E.R. Fábán 137

A Comparative Study on the *In Vitro* Degradation of PLA Processed by FFF and Film Extrusion

K.K. Abdullah and K. Molnár 147