

# Table of Contents

## Preface

## Chapter 1: Properties and Processing of Structural Metals

|                                                                                                                                                                                                        |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>The Properties of Ti-6Al-4V Alloy in Post-Quenched Conditions</b><br>S. Piyush Kaila, V. Panwar, S. Dewangan and A. Goyal                                                                           | 3  |
| <b>Comparative Analysis of Flow Stress Distribution in CM247LC Superalloy during Hot Deformation: A Study Using Gleeble 3800 GTC and Q-Form 3D Simulation</b><br>P. Gagrai, J. Jha and S. Chakrabarty  | 13 |
| <b>Investigation on the Weldability, Mechanical and Metallurgical Properties of Activated Tig Weldments of Aluminium Alloy 7075</b><br>S. Rajkumar, K.S. Aadhityaa, E. Venkatachalam and M. Vasanthraj | 25 |

## Chapter 2: Fracture Mechanics and Failure Analysis of Materials and Structures

|                                                                                                                                                                                                                                    |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Effects of Fiber Type and Hybridization on the Tensile Properties and Fracture Behavior of Epoxy Composites</b><br>Y. Sahin                                                                                                     | 35 |
| <b>A Novel Approach for Modelling Crack Paths in Plate Structures for Dynamic Response Analysis</b><br>Y.L.A. Alshammari, M. Khan, F. He and H.D. Kati                                                                             | 49 |
| <b>Effects of UV Radiation-Induced Aging on the Tensile Mechanical Behavior of Polyamide: Implications for Telecommunications and Energy Applications</b><br>A. Morales-Ortiz, J. Marín, C. Quintero, J.A. Rios and T.T. Marulanda | 59 |
| <b>Comparison of Two Typical Adhesive Fracture Mechanics Considering Hygrothermal Aging</b><br>S.Y. Li, J.W. Zhang, D. Wang, C. Li, J.W. Shi and D. Chen                                                                           | 71 |
| <b>Fracture Risk Modeling in Pyrolyzed Phenolic Resin: Microstructure Prediction and Stress Concentration Factor Evolution via CNN-CVAE and FEM</b><br>W.H. Chen, S.H. Niu, D. Wang, C. Li, D. Chen and J.W. Shi                   | 79 |

## Chapter 3: Additive Manufacturing

|                                                                                                                                                                                                                                                |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Advanced Biodegradable Polymer Materials and Additive Manufacturing</b><br>Z. Zahir, I. Hanafi and J. El Bahaoui                                                                                                                            | 95  |
| <b>Optimizing FDM/FFF in Additive Manufacturing: A Review of Process Parameters and Material Impacts on Mechanical Properties</b><br>T. Hachimi, F. Majid, F. Ait Hmazi and R. Rhanim                                                          | 125 |
| <b>Numerical and Experimental Insights into Crack Propagation in 3D-Printed ABS Using XFEM and Tensile Analysis</b><br>T. Hachimi, F. Majid and F. Ait Hmazi                                                                                   | 153 |
| <b>Characterizing the Microstructure and Performance of Mechanical Properties in Polylactic Acid/Copper Metal Infill Polymer Composites Fabricated through Fused Deposition Modeling</b><br>K. Kiran, B.R. Kannan, R.R. Rinto and N. Suprateek | 163 |
| <b>Investigation on Mechanical Properties of Bio-PETG Filament in FDM 3D Printing</b><br>V.P. Pradeep, A.K. Palaniappan, R. Karthikeyan, K.G. Aravind and M. Vignesh                                                                           | 173 |