

Preface

The rapid advancement of science and technology has defined the vital role of materials science and engineering in shaping modern industries and addressing pressing global challenges of technical and technological progress. This special edition reflects the multifaceted nature of these disciplines, encompassing cutting-edge research and practical applications.

Chapter 1, Functional and Special Materials, explores innovative materials with tailored properties designed to meet specific demands in areas such as alternative energy, biomedicine, and sustainable manufacturing. These research results demonstrate how material functionality is being redefined to solve complex engineering problems.

Chapter 2, Materials for Electronic Devices, is dedicated to a special branch of materials science underpinning the production of productive and reliable next-generation electronic systems, from semiconductors to nanostructured devices. This chapter highlights the integration of advanced materials with technological innovation to drive progress in the electronics sector.

Chapter 3, Failure Analysis, provides a series of research results of mechanisms and methodologies for diagnosing material failures. By investigating failure causes at micro and macro levels, this section equips researchers and engineers with insights into enhancing material durability and safety, ensuring the long-term performance of machines and equipment.

Finally, Chapter 4, Machines and Equipment Designing, emphasises the interplay between material properties and engineering principles to create efficient, robust, and sustainable production systems. This chapter showcases how thoughtful design, coupled with material optimisation, is essential for developing next-generation machinery and equipment.

This special edition offers a comprehensive view of the dynamic and interconnected fields of materials science and mechanical engineering and aims to inspire further research and innovation fostering solutions that will shape the industries of tomorrow.