Preface

Today, we can see the increasing need for materials that are not only high-performing but also adaptable to new challenges in sustainability, environmental protection, and advanced manufacturing. This special edition presents the results of engineering research in the latest materials encompassing polymers and composites, metals, and environmental remediation technologies.

Chapter 1: Polymers and Composites.

This chapter offers a comprehensive overview of polymeric and composite materials properties, exploring their synthesis and performance across a range of applications. Themes include polymer chemistry, the role of nanofillers, fiber-reinforced composites, and advancements in bio-based and biodegradable materials. Emphasis is placed on how structure-property relationships influence mechanical strength, thermal stability, and environmental resistance.

Chapter 2: Properties and Processing of Metal Materials.

Focusing on the important role of metals in modern engineering, this chapter examines their physical and mechanical properties, alongside critical processing techniques. Topics include microstructural evolution, alloy synthesis, deformation mechanisms, and state-of-the-art manufacturing methods such as equal channel angular pressing and additive manufacturing.

Chapter 3: Photocatalysts for Wastewater Treatment.

Addressing one of the most pressing environmental concerns, this chapter explores the development and application of photocatalytic materials for the treatment of wastewater. It covers the mechanisms of photocatalysis, material design (including metal oxides, doped semiconductors, etc.), and performance optimization under visible and UV light. Real-world case studies and recent innovations illustrate the potential of photocatalysts in achieving sustainable water purification.

This edition is intended for researchers, engineers, and students seeking to deepen their understanding of modern materials science and its role in solving real-world engineering and technological challenges.