

## Preface

The ever-evolving field of material science stands at the forefront of technological progress, addressing challenges and opportunities across diverse production sectors. This special edition offers readers explorations in some significant areas within materials science and materials processing technologies, showcasing recent advancements and innovations in these fields.

The first chapter is dedicated to an analysis of optimal parameters of ultrasonic welding technology, residual fatigue life estimation of damaged welded structures, etc.

The next chapter explores the unique properties and application methods of silicon with porous structures, a material increasingly critical in areas such as sensor technologies, drug delivery systems, energy storage and materials absorption due to its high surface area and functional versatility.

The last chapter presents some examples of computational methods in materials research and design, demonstrating how simulations and modelling help our understanding of materials structure and properties.

This special edition aims to serve as a valuable resource for researchers, engineers, and students whose activities are related to materials and technologies.