

Preface

The presented special edition is dedicated to analysing properties and processing technologies for modern structural materials such as nanocomposites, steel and alloy.

The review of synthesis methods and electrical and dielectric properties of various polymer-metal hybrid nanocomposites could be important for choosing composite materials with functional properties for special applications in equipment, electronics, energy storage, etc.

The post-processing of wire-arc additive-manufactured metallic specimens is a significant technological part of modern mechanical engineering. These technological operations improve the internal and surface structure of the final product, its mechanical properties, etc. The analytical and numerical modelling of wire-arc additive manufacturing can be used in modern digital manufacturing.

A micromechanical-based model incorporating several deformation mechanisms and formulated in the framework of the dislocation density theory is chosen to model the viscoplastic behaviour of the 316L stainless steel. After adaptation and implementation of the model into the finite element approach and the calibration of the model parameters with experimental available results, simulations of healthy and notched tubular specimens can be carried out.

The optimisation of the antibacterial properties of bioceramic coating on medical steel and titanium alloy surfaces is an important component in the development of modern medical instruments, prostheses and implants in dentistry and orthopaedic.

This special edition will be helpful to a wide range of specialists in materials for various spheres of their application.