Special Issue

Advances in Polymer-Based Nanocomposites for Multifunctional Applications

Message from the Guest Editor

This Special Issue seeks to explore the integration of nanostructured fillers, such as carbon-based nanomaterials, metal and metal oxide nanoparticles, and hybrid nanostructures, into polymer matrices to enhance mechanical, thermal, electrical, optical, and barrier properties. The aim is to highlight interdisciplinary approaches that address both fundamental and applied challenges in developing next-generation materials for sectors such as energy storage, flexible electronics, structural composites, environmental remediation, and biomedical devices.

The Special Issue welcomes contributions that address these issues through novel synthesis methods, interface engineering, predictive modeling, and advanced characterization techniques. Emerging research directions such as self-healing materials, stimuli-responsive composites, recyclable and sustainable nanocomposites, and bio-based polymer systems are particularly encouraged. Papers that offer insights into lifecycle analysis, performance optimization, and real-world application case studies will also be of great interest.

Guest Editor

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