Special Issue

Recent Discoveries of Novel Ablative Thermal Protection Nanocomposites and Nanostructures

Message from the Guest Editor

One of the most critical challenges in developing thermal protection systems (TPS) for aerospace vehicles lies in understanding and optimizing the ablative behavior of materials in extreme environments. Thermal protection materials must withstand ultra-high temperatures and intense aerodynamic–thermal–chemical coupling while maintaining structural integrity. Therefore, the preparation of novel thermally protective nanocomposites, the development of unique thermally protective nanostructures, and the in-depth investigation of the mechanism of the fine-scale ablative degradation behavior of nanocomposites have become the focus of future research in this field. This Special Issue is dedicated to presenting the latest advances in lightweight ablative thermally protective nanocomposites and nanostructures, bridging the gap between materials science, structural engineering, and performance simulation and prediction. We aim to highlight the current state-of-the-art in ablative materials design and synthesis, structural innovations, and high-fidelity simulations that capture the complex thermal–mechanical–chemical interactions during ablation.

Guest Editor

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Message from the Editor-in-Chief

Nanoscience and nanotechnology are exciting fields of research and development, with wide applications to electronic, optical, and magnetic devices, biology, medicine, energy, and defense. At the heart of these fields are the synthesis, characterization, modeling, and applications of new materials with lower nanometer-scale dimensions, which we call “nanomaterials”. These materials can exhibit unusual mesoscopic properties and include nanoparticles, coatings and thin films, metal–organic frameworks, membranes, nano-alloys, quantum dots, self-assemblies, 2D materials such as graphene, and nanotubes. Our journal, *Nanomaterials*, has the goal of publishing the highest quality papers on all aspects of nanomaterial science to an interdisciplinary scientific audience. All of our articles are published with rigorous refereeing and open access.

Editor-in-Chief

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