Special Issue

Low-Dimensional Nanocomposites for Energy Harvesting, Storage, and Conversion

Message from the Guest Editors

Energy harvesting, conversion, and storage technologies are essential for sustainable development, as they convert ambient energy to electricity and store it to meet modern energy demands. Low-dimensional nanocomposite materials play a significant role in advancing energy harvesting, energy conversion, and storage technologies, owing to their unique properties and capabilities achieved through the synergistic integration of low-dimensional nanomaterial fillers (such as 0D, 1D, and 2D) with polymers or other materials. In triboelectric mechanical energy harvesting, low-dimensional nanocomposites facilitate the efficient generation of electricity through the contact and separation of materials based on the coupling of contact electrification and electrostatic induction. Furthermore, nanocomposite materials have revolutionized the field of energy storage by increasing the effective surface area of electrodes, resulting in increased specific capacitance, energy density, and cyclic lifespan. This novel approach not only increases the cycle life of supercapacitors but also increases their flexibility and adaptability for a wide range of applications.

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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.

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