Special Issue

Nanofunctional Electrode Materials

Message from the Guest Editors

Energy storage devices with high electrochemical performances play vital roles in the conversion and efficient utilization of electrical energy. To maximize the energy density and power density of the electrode materials, it is essential to increase the volume/mass utilization rate and the electrochemical reaction rate. The electrochemical energy storage mechanisms of electrode materials are mainly divided into the battery energy storage mechanisms of intercalation, conversion, and alloying, and the supercapacitor energy storage mechanisms of electric double-layer reaction and pseudocapacitance reaction. With the research into electrode materials, higher volume/mass utilization also means more electrochemically active sites, larger electrode liquid–electrode contact areas, and more adequate electrochemical reactions. Through the design of high-performance electrode materials with nanometric or otherwise smaller particle size, the combination of the physical properties of the electrode material itself, the electrochemical mechanism, and advanced in situ electron microscopy technology, we can carry out precise electrochemical reactions and undertake mechanistic exploration.

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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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