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Surface Modification of Advanced Transition Metal-Based Materials for Electrochemical Energy Storage

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Message from the Guest Editor

Widespread application of fossil fuels for energy generation and transportation purposes has dramatically increased the concentration of greenhouse gases in the atmosphere, causing an unprecedented rise in the Earth's temperature and acidification of the oceans. Therefore, there is an urgent need to reduce the devastating consequences of global warming. Meanwhile, transition metal compounds are also rich in physical and chemical properties and widely used in electrochemical energy storage. They are key materials for chemical power supply, such as lithium/sodium-ion batteries, lithium–sulfur batteries, metal air batteries, supercapacitors, etc. They are usually of variable valence, composition and structure, involved in complex chemical reactions and structure–activity relationships. Developing their controllable preparatory methods, revealing the laws of physical properties, building battery devices, and achieving high-density energy storage have been the hot spots and focuses of cross-disciplinary research in chemistry, materials, energy and other disciplines.

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Message from the Editorial Board

Now more than ever, research is asked to deliver knowledge and technologies to solve the major challenges faced by our society. The development of new materials and devices for (without the ambition to be exhaustive) energy, health and food technology, together with the need for establishing processes that reduce the impact on critical resources and the environment, is indeed in the spotlight of most contemporary research. Surface science and engineering play a key role in this regard, with an incredible potential in delivering new and deep scientific understanding and technical solutions essential to solve most of the major societal challenges.

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