International Journal of Electrochemistry

Hindawi

Special Issue on

Nanostructured Transition Metal Oxides, Carbides, Nitrides, and Sulfides for Electrochemical Energy Systems

CALL FOR PAPERS

Among the myriad electrochemical energy storage devices, supercapacitors and batteries are at the forefront due to the obvious reasons of high power density and specific energy, respectively. However, an ideal energy storage system needs to have both these performance indicators along with other key parameters such as cycle life, shelf-life, and safety. Owing to specific charge storage mechanisms, supercapacitors stores little energy per given weight or volume and batteries charge slowly. In recent years, transition metals based materials (metal oxides, carbides, nitrides, and sulfides) have attracted great attention as electrodes in supercapacitors and batteries due to their unique physical and electrochemical properties. These materials have been successfully explored in hybrid or asymmetric supercapacitors (as source of enormous pseudocapacitance), lithium and sodium ion batteries (as host for ion intercalation), metal-sulfur batteries (as conducting host for sulfur), and metal-air batteries (as catalyst for ORR and OER at cathode). By employing advanced nanostructures of such materials, substantial advancements have been witnessed in the device performance of abovementioned electrochemical energy systems. However, there is still a lot of room for the improvement in the electrochemical response of these materials by developing new synthesis routes and advanced nanostructures and further understanding of their behaviour in aforesaid energy storage devices.

In order to benchmark the current status of research in this field, International Journal of Electrochemistry invites original research articles for a special issue dedicated to transition metals based nanostructured materials for next-generation supercapacitors and batteries. Topics related to the ongoing strategies for designing novel 0D, 1D, 2D, and 3D nanostructures of transition metal oxides, carbides, nitrides, and sulfides are welcomed in this special issue with specific attention to the effect of their properties (morphology, shape, size, porosity, oxidation state, composite formation, etc.) on their behavior in supercapacitors and batteries. Further, original manuscripts on the development of nanocomposite/hybrid materials with carbon or other materials like conducting polymers are also welcomed. Investigators are also encouraged to submit review articles that provide a comprehensive overview of the ongoing cutting-edge research in this area.

Potential topics include but are not limited to the following:

- Nanostructures of metal oxides, carbides, nitrides, and sulfides for supercapacitors and hybrid capacitors (e.g., Li-ion capacitors and Na-ion capacitors)
- Nanostructured metal oxides, carbides, nitrides, and sulfides for monovalent batteries (e.g., Li+, Na+, and K+) and multivalent batteries (e.g., Mg2+, Al3+)
- Transition metal oxides, carbides, nitrides, and sulfides for advanced metal-sulfur battery systems (e.g., Li-S, Na-S, and Mg-S)
- Transition metal oxides, carbides, nitrides, and sulfides for ORR and OER in metal-air batteries (e.g., Li-O2, Na-O2, Mg- O2, and Zn-O2)
- Nanocomposites/hybrids of metal oxides, carbides, nitrides, and sulfides with conducting polymers, graphene, CNTs or other carbon materials for above-mentioned energy storage systems
- Substrate (3-D Ni-foam, carbon cloth, carbon nanofiber mats, graphene paper, and other substrates) supported nanostructures of metal oxides, carbides, nitrides, and sulfides for supercapacitors and batteries

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/ijelc/btmo/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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