

Tentative Outline

Special Thematic Issue for the journal *Current Nanoscience*

Title of Thematic Issue: Graphene and 2D Materials for Energy Storage and Conversion

Guest Editors:

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• Scope of the Thematic Issue:

This thematic issue will discuss the recent advances in graphene-based nanomaterials for different energy technologies. Graphene possesses high surface area, stable structure and exhibits many interesting electronic, optical and mechanical properties due to its 2D crystal structure. Graphene has been found to be of both fundamental interest and suitable for a wide range of potential applications. Graphene is atomically thin two-dimensional (2D) system of sp² carbon atoms organized in hexagonal lattice structure. Graphene has been applied for many energy applications such as supercapacitors, LiB, fuel cells, and solar cells. Supercapacitors can be classified into two main categories based on the energy storage mechanism, pseudocapacitors (PCs) and electrochemical double-layer capacitors (EDLCs). PCs store electrical energy faradically by electron charge transfer between electrode and electrolyte. Metal oxides and conducting polymers are used as electrode materials for PCs. In EDLCs, a double layer of electrolyte ions is formed on the surface of an electrode material, which arises from the potential-dependence of the surface density of charges stored electrostatically. Graphene based materials possessing high surface areas as the electrode materials, and the capacitive originates from the charge accumulation at the interface between electrode and electrolyte.

Keywords: Graphene, 2D, Nanomaterials, Energy, Supercapacitors, LiB, Fuel cells, Solar cells

Sub-topics:

The sub-topics to be covered within the issue should be provided:

1. Preparation and characterization of graphene and its nanocomposites
2. Investigation of the graphene and its nanocomposites toward energy storage and conversion
3. Evaluate the operation conditions and studying the storage mechanism

Schedule:

Articles submission deadline: 30 January 2022

Articles Evaluation: 30 February 2022

Articles Review: 30 March 2022

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