Title:	Modulation Of Graphene And Its Hybrid Nanostructures Toward The Development Of Hybrid Energry Storage Devices
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Abstract:	n account of the intermittent nature of renewable resources, electrochemical energy storage systems (EESs) are realized as crucial divisions in energy technologies that have the capability to store the energy from renewable energy resources when not needed and make it utilized for later use. The commonly known EES systems are battery receiving high energy density and supercapacitors (SCs) i.e., full of power, are the main components in an energy-efficient hardware network. The distinct features of battery and SCs are due to their charge storage mechanisms: diffusion-controlled process responsible for high energy density in battery and surface-controlled process brings the high-power output in SCs. The strategy to design the electrode materials should focus on the device performance in terms of capacity output, sufficient energy- power density correlation, and stability factor which in turn are dependent on the material's electrical conductivity and porosity characteristics. Nanostructured graphene as an electrode material is emerging in the storage field due to its remarkable electrical, optical and mechanical properties. The present study is focused on the exploration of such electrode material with the facile synthetic process, their morphological advances and can be utilized as metal-free planar structured solid EES system. Finally, the mixed kinetics of battery and SCs were utilized to develop a hybrid energy device i.e., BSH (battery-supercapacitor hybrid) system with optimum energy and power density values. The versatile systems developed in each and every project gives a new avenue for the development of sustainable energy storage system for the continuous power run.
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