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Transition metal oxide-based nanomaterials for high energy and power density supercapacitor

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Abstract

Recently, the demand for energy sustainability has progressively increased, and the high rate of the world energy depletion has also accelerated the efforts in finding and refining alternative energy resourceful devices. In terms of augmenting the existing storage devices, supercapacitors are superior to the battery technology, but have also been a fundamental concern to scientists recently. Energy storage is as important as energy production, hence, the need for effective storage systems especially in our modern electrical and electronic devices. To effectively manage our energy requirements nowadays, our present society wants small, light weight, inexpensive, and environmentally friendly energy storage systems (Meng et al. 2010). Presently, the battery is a widely used energy storage system, but its unassailability, high discharge rate, slow charge rate, and small lifespan limit its use in modern electronics devices (Meng et al. 2010). Supercapacitors have shown to be a better option for storage of energy because of their better energy and power density, light weight, quick charge rate, and long lifespan (Jayalakshmi and Balasubramanian 2008).