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Mesoporous RGO@(Co,Mn)3O4 Nanocomposite Prepared by Microwave Method and Its Electrochemical Performance

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Abstract : Supercapacitors are energy storage devices capable of storing more energy than conventional capacitors and have higher power density than batteries. The advantages of this method include the non-use of reducing agents and acidic medium, and no further use of a post-heat treatment unlike the conventional processes, in which calcination is generally employed after obtaining the initial product. Furthermore, it also offers a shorter reaction time at low temperatures and low power requirements, which allows low fabrication and energy cost. In this study, microwave irradiation was used for the facile and rapid synthesis of mesoporous RGO@(Co,Mn)3O4 nanosheets as an electrode material. The as-prepared electrode exhibited a high capacitance of 953 F•g^−1 at 1 A•g^−1 in a 6 M KOH electrolyte solution. Moreover, the electrode exhibited a high energy density of 76.2 Wh•kg^−1 at a power density of 720 W•kg^−1, and a high power density of 7200 W•kg^−1 at an energy density of 38 Wh•kg^−1. The successful methodology was considered to be efficient and cost-effective, thereby providing an active electrode material with very promising electrochemical performance.

Keywords : cobalt-manganese oxide, electrochemical, graphene, microwave synthesis, supercapacitor
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