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High Electrochemical Performance of Electrode Material Based On Mesoporous RGO@(Co,Mn)3O4 Nanocomposites

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Abstract : The quest for alternative sources of energy storage had led to the exploration on supercapacitors. Hybrid supercapacitors, a combination of carbon-based material and transition metals, had yielded long and improved cycle life as well as high energy and power densities. In this study, microwave irradiation was used for the facile and rapid synthesis of mesoporous RGO@(Co,Mn)3O4 nanosheets as an active electrode material. The advantages of this method include the non-use of reducing agents and acidic medium, and no further post-heat treatment. Additionally, it offers shorter reaction time at low temperature and low power requirement, which allows low fabrication and energy cost. The as-prepared electrode material demonstrated a high capacitance of 953 F•g−1 at 1 A•g−1 in a 6 M KOH electrolyte. Furthermore, the electrode exhibited a high energy density of 76.2 Wh•kg−1 (power density of 720 W•kg−1) and a high power density of 7200 W•kg−1 (energy density of 38 Wh•kg−1). The successful synthesis was considered to be efficient and cost-effective, with very promising electrochemical performance that can be used as an active material in supercapacitors.

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