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Influence of Deposition Temperature on Supercapacitive Properties of Reduced Graphene Oxide on Carbon Cloth: New Generation of Wearable Energy Storage Electrode Material

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Abstract : Flexible electrode material with high surface area and good electrochemical properties is the current trend captivating the researchers across globe for application in the next generation energy storage field. In the present work, crumpled sheet like reduced graphene oxide grown on carbon cloth by the hydrothermal method with a series of different deposition temperatures at fixed time. The influence of the deposition temperature on the structural, morphological, optical and supercapacitive properties of the electrode material was investigated by XRD, RAMAN, XPS, TEM, FE-SEM, UV-VISIBLE and electrochemical characterization techniques.The results show that the hydrothermally synthesized reduced graphene oxide on carbon cloth has sheet like mesoporous structure. The reduced graphene oxide material at 160°C exhibits the best supercapacitor performance, with a specific capacitance of 443 F/g at scan rate 5mV/sec. Moreover, stability studies show 97% capacitance retention over 1000 CV cycles. This result shows that hydrothermally synthesized RGO on carbon cloth is the potential electrode material and would be used in the next-generation wearable energy storage systems. The detailed analysis and results will be presented at the conference.

Keywords : graphene oxide, reduced graphene oxide, carbon cloth, deposition temperature, supercapacitor
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