Ordered Mesoporous Carbon-MoO_2 Nanocomposites as Supercapacitor Electrodes

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Ordered mesoporous carbon (OMC)/metal oxide nanocomposites have shown excellent performance in various field such as catalysis and energy storage due to their beneficial properties: i)high surface area which results in more physicochemical active sites; ii) ordered mesoporous structures contributing to a nanosized sub-structure[1-2].
In this work, preparation of OMC-MoO2 nanocomposites by triconstituent (reseol, MoCl5 and F127) co-assembly method was firstly reported. The mesostructure of the acquired nanocomposite was confirmed by TEM, XRD, XPS, EDX and physical sorption. The results indicated that the as-prepared carbon composite with different fraction of MoO2 (9wt%-38wt%) processed ordered mesoporous structures and good dispersion of MoO2 nanophases. Gradual collapsing of ordered structure was observed in the case of higher MoO2 fraction. The OMC-MoO2 nanocomposites were investigated as supercapacitor electrodes. Due to the most available pseudocapacitive sites and strong attachment between the MoO2 and carbon phase, the composite with 38wt% MoO2 showed the highest capacitance with stable cycle performance.