Synthesis of Micro/nanostructured Carbon from Refined Sugar and its Electrochemical Performance

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Micro/nano-structured carbon (MNC) was synthesized by nanocasting method and anhydrous pyrolysis process at 1000 °C using refined sugar as carbon precursor and SBA-15 as structure directing agent. SBA-15 was prepared through sol gel using the copolymer triblock non ionic pluronic P-123 as surfactant and tetraethyl orthosilicate as Si precursor. The prepared materials were characterized by means of N₂ physisorption, Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), Raman spectroscopy, scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), high resolution transmission electron microscopy (HRTEM) and cyclic voltammetry (CV). The applied characterization techniques revealed that MNC has a mesoporous and turbostratic structure with rope like morphology composed by a set of carbon nanofibers and carbon nanotubes wrapped by thin graphene layers with large specific surface area (1292 m²/g) and large pore volume (1.2 cc/g), so MNC is a promising material for applications in adsorption, energy storage and solar cells, supercapacitor electrodes and electrocatalytic supports.

Keywords: SBA-15, nanocasting, carbon nanotubes, carbon nanofibers, turbostratic carbon

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