Preparation and Electrocapacitive Properties of Hierarchical Porous Carbons Based on Synthesized 1,3,5-tris (1-imidazolyl) benzene

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In this paper, we report the preparation of four porous carbons denoted as TC-1, TC-2, TC-3, and TC-4 based on synthesized 1,3,5-tris (1-imidazolyl) benzene (tib) through carbonization at different temperatures under inert gas atmosphere and their electrocapacitive properties for supercapacitor applications. The specific surface areas of as-made TCs were 309, 419, 305 and 73 m²/g mainly with micropores, respectively. The results of electrochemical tests show quasi-rectangular shapes of all the cyclic voltammeteries of the four supercapacitors (SC-TCs), even under a high scan rate of 500 mV·s⁻¹. The specific capacitances of SC-TCs at 0.1 A·g⁻¹ were 88.5, 102.1, 101.9 and 18.3 F·g⁻¹, respectively in 6 M KOH solutions. The structure-property relationship of TCs is discussed and analyzed on the basis of the experimental data. Our results provide a novel route for the preparation of porous carbon materials from synthesized benzene-contained organic compounds and exhibit the potentiality for application in energy storage.

Keywords: 1,3,5-tris (1-imidazolyl) benzene; porous carbon; carbonization; capacitance; hydrothermal synthesis

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