

Production of activated carbon cloth with controlled structure and porosity from a new precursor

J. M. Valente Nabais \AA T. Cana'rio \AA P. J. M. Carrott \AA M. M. L. Ribeiro Carrott

Received: 24 January 2006 / Revised: 25 July 2006

_ Springer Science+Business Media, LLC 2007

Abstract The production of micro and mesoporous activated carbon cloth (ACC) from commercial acrylic textile fibres by physical activation with carbon dioxide and the addition of boric acid and sodium hydrogen phosphate as impregnants is reported. The use of sodium hydrogen phosphate leads to samples with greater mesopore volume whereas other ACC production conditions studied mainly result in microporous materials. This work demonstrates that it is possible to produce carbon materials from a commercial acrylic textile cloth with the maintenance of the precursor shape, as shown by scanning electron microscopy (SEM). The materials are formed from layers of aromatic sheets that in a nanoscale resemble graphite and X-ray diffraction studies indicate microcrystallites with dimensions between 5.9 and 7.6 nm for L_a (width) and between 2.4 and 2.7 nm for L_c (height), corresponding to 7 to 8 parallel graphene layers.

Keywords Activated carbon cloth _ Acrylic fibers _ Microporous materials _ Physical activation _ X-ray diffraction _ Nitrogen adsorption