

Choma, J., Jedynek, K., Gorka, J., Jaroniec, M. Soft-templating Synthesis of Mesoporous Carbons in the Presence of Iron(III) Nitrate. *Ochrona Srodowiska* 2013, Vol. 35, No. 2, pp. 3–8.

Abstract: Soft-templating synthesis of mesoporous carbons was carried out in the presence of iron(III) nitrate by using resorcinol and formaldehyde as carbon precursors and Lutrol F127 (EO₁₀₁PO₅₆EO₁₀₁) block copolymer as a soft template. Iron(III) salt was used as a precursor for the formation of iron-containing particles and a low temperature graphitization catalyst. The resulting composites possessed high specific surface area (587 m²/g and 440 m²/g), large pore volume (0.44 cm³/g and 0.35 cm³/g) and mesoporosity of about 65%. Examination of their pore size distributions indicated presence of micropores of about 1.6 nm in size and mesopores of about 8 nm in size. Small angle X-ray diffraction pattern recorded for carbon sample prepared by using 10 wt% iron(III) solution featured one distinct peak, possibly an indication of the ordered mesostructure. Thermogravimetric analysis indicated that only about 50% of iron used was successfully incorporated into these carbons, which resulted in the presence of metallic iron and iron carbide nanoparticles. Also, it was found out that iron presence during the carbonisation process contributed to the partial graphitization of amorphous carbon mesostructure. High specific surface area, well developed porosity and magnetic properties of these carbons extend their potential in adsorption, catalytic and energy-related applications.

Keywords: Mesoporous carbon, soft-templating, iron particles, adsorption, porosity.