

Gorka, J., Jaroniec, M. Choma, J. Physicochemical Properties of Soft-templated Mesoporous Carbons with Iron- and Nickel-containing Nanoparticles. *Ochrona Srodowiska* 2011, Vol. 33, No. 2, pp. 3–9.

Abstract: Mesoporous carbon composites containing iron or nickel were successfully synthesized by the soft-templating method under acidic conditions using phloroglucinol and formaldehyde as carbon precursors, the poly(ethylene oxide)–poly(propylene oxide)–poly(ethylene oxide) triblock copolymer as a soft template, and iron(III) chloride or nickel(II) nitrate hexahydrate as nanoparticles precursors. The as-synthesized composites were carbonized at three different temperatures: 700 °C, 850 °C and 1000 °C. XRD and thermogravimetric analysis revealed the presence of Fe- and Ni-containing nanoparticles (below 2 wt.%) in the form of Fe₃C, Ni and NiH in the resulting mesoporous carbons. Nitrogen adsorption, X-ray diffraction and Raman spectroscopy proved good adsorption and structural properties of the composites studied, which include high surface area and large total pore volume, with main contribution arising from mesopores with diameters of about 10 nm. The latter and the fact that the resulting composites are stable up to 460–480 °C make them attractive materials for adsorption, catalysis, environmental and energy-related applications.

Keywords: Mesoporous carbons, soft-templating synthesis, block copolymer, iron carbide nanoparticles, nickel nanoparticles, adsorption.