

Choma, J., Jedynak, K., Gorka, J., Jaroniec, M. Morphology and Adsorption Properties of Mesoporous Carbons with Silver Nanoparticles. *Ochrona Srodowiska* 2011, Vol. 33, No. 1, pp. 3–8.

Abstract: Soft-templated mesoporous carbons were successfully synthesized in the presence of silver nanoparticles, using resorcinol and formaldehyde as carbon precursors and triblock copolymer Lutrol F127 ($\text{EO}_{101}\text{PO}_{56}\text{EO}_{101}$) as a soft template. Two different loadings of ~ 90 nm silver nanoparticles (10 wt. % and 20 wt. %) were introduced into the carbon framework. The final carbon-silver composite materials exhibited a high surface area ($\sim 650 \text{ m}^2/\text{g}$) and a large total pore volume ($\sim 0.55 \text{ cm}^3/\text{g}$), where mesoporosity accounts for about 70% of the total pore volume. Pore size distribution curves confirm the presence of micropores (~ 2.0 nm) and mesopores (~ 6.0 nm). SEM images indicate heterogeneous dispersion of nanoparticles of silver in the carbon structure of carbon-silver composites. The occurrence was detected of differently shaped single and aggregated silver nanoparticles varying in size from ~ 50 nm to several hundred nanometers. The well-developed porous structure with embedded silver nanoparticles substantiates the applicability of these composite carbon-silver materials in many catalytic and adsorption processes as well as water purification processes.

Keywords: Adsorption, XRD, SEM, synthesis, mesoporous composite materials, nanoparticles, silver, soft-template, block copolymer.