
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 (EO$_{101}$PO$_{56}$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 (~650 m$^2$/g) and a large total pore volume (~0.55 cm$^3$/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.