



Preparation, characterization, and iodide sorption performance of silver-loaded mesoporous MCM-41

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ABSTRACT

Mesoporous MCM-41 has been modified by incipient wetness impregnation with silver atoms as a new sorbent for iodide. The Ag-modified mesoporous MCM-41 (Ag-MCM-41) was characterized using X-ray diffraction, surface area, pore volume and pore size analyzer, and scanning electron microscopy/energy dispersive spectroscopy techniques, and its sorption behavior for iodide was studied. The effects of pH, contact time, temperature, initial concentration of iodide, and competing anions such as chloride and fluoride were investigated by batch method. The sorption capacity was very high in the pH range of 1.0–3.0. The kinetic analysis revealed that the overall sorption process was fitted with the pseudo-second-order kinetic model. The experimental sorption isotherm is also successfully described by Langmuir and Freundlich models. The maximum sorption capacity of iodide onto Ag-MCM-41 was found to be 238.1 mg g⁻¹.

Keywords: Mesoporous MCM-41; Impregnation; Silver; Iodide sorption

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