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THE STUDY OF BATCH ADSORPTION OF URANIUM IONS BY MCM-48 MATERIALS SYNTHESIZED AT ROOM TEMPERATURE

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Abstract

The mesoporous MCM-48 was synthesized at room temperature with different templates such as hexadecytrimethylammonium bromide (C_{16}TABr), hexadecytrimethylammonium chloride (C_{16}TACl) and dodecyltrimethlammonium chloride (C_{12}TACl). The obtained materials were characterized by XRD, N_2 adsorption/desorption, FTIR and SEM techniques, and their performance as uranium adsorbent were investigated. To do so, the effect of contact time, pH of solution, initial uranium concentration and temperature were investigated in batch reactor.
The results showed that the adsorption process was favorably fitted with the second-order kinetic model and the isotherm obeys to Langmuir model. Moreover, the maximum adsorption capacity of MCM-48 for uranium (VI) was of the order of 160 mg/g^{-1}. The thermodynamic parameters indicated that the sorption of uranium ions on MCM-48 materials was a spontaneous and endothermic process.

Key words: adsorption, characterization, MCM-48, synthesis, uranium

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