



Synthesis of surfactant-modified ZSM-5 nanozeolite for the removal of nickel (II) from aqueous solution

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ABSTRACT

Removal of nickel ions from aqueous solutions using modified ZSM-5 nanozeolites was investigated. Experiments were conducted in terms of different solute concentrations, temperatures, and pH. Mesoporous Na-ZSM-5 zeolite was modified with tetrapropylammonium bromide (TPABr) and sodium dodecylsulfate (SDS) by using the impregnation method. The modified zeolites were characterized by X-ray diffraction, Fourier transform infrared spectroscopy, Brunauer–Emmett–Teller, and scanning electron microscope techniques. According to the results, SDS-ZSM-5 revealed a higher adsorption capacity than Na-ZSM-5 and TPA-ZSM-5. Langmuir and Freundlich adsorption models were used for the mathematical description of the adsorption equilibrium. The analyses revealed that the sorption of Ni(II) could be considered an endothermic and spontaneous process.

Keywords: Nanozeolites; Surfactants; Characterization; Adsorption; Nickel removal

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