

Removal of copper ions by modified sepiolite samples

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ABSTRACT

This paper presents the adsorption of Cu(II) from aqueous solution by raw sepiolite (RS), manganese oxide-coated sepiolite (MCS), and base activated sepiolite (BAS) samples. Adsorption of Cu(II) by sepiolite samples was investigated as a function of the initial Cu(II) concentration, solution pH, ionic strength, temperature and the presence of an inorganic ligand (Cl⁻). Changes in the surface and structure were characterized by means of XRD, IR and N₂ gas adsorption data. The Langmuir monolayer adsorption capacities of RS, MCS and BAS in 0.1 M KNO₃ solution were calculated to be 5.55, 6.70 and 13.46 mg/g, respectively. ΔG , ΔH and ΔS were determined as -18.94 kJ/mol (at 303 K), 25 kJ/mol and 145 J/mol K, -19.51 kJ/mol (at 303 K), 2 kJ/mol and 71 J/mol K and -20.51 kJ/mol (at 303 K), 31 kJ/mol and 170 J/mol K for RS, MCS, and BAS, respectively.

Keywords: Sepiolite; Adsorption; Thermodynamic; Clay; Copper ions

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