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MODELING EQUILIBRIUM DATA FOR Cd (II) ADSORPTION BY PEAT USING NON-LINEAR REGRESSION ANALYSIS

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Abstract

The Romanian peat was used as low-cost adsorbent to remove Cd(II) ions from aqueous solutions. The cadmium adsorption capacity of the peat was studied as a function of the solution pH (3-5.5) and temperature (293 – 333 K). Adsorption capacity was found to increase with the pH increasing and temperature decreasing and attained a maximum value of 27.9 mg/g at pH = 5±0.1 (acetate buffer) and 293 K. In addition, various thermodynamic parameters such as free energy change (ΔG^0), enthalpy change (ΔH^0), entropy change (ΔS^0) along with isosteric heat of sorption (ΔH_x) were calculated. The adsorption of Cd (II) ions by peat was found to be a spontaneous and exothermic process, which is governed by electrostatic interactions (physisorption). FT-IR analysis of the peat before and after Cd (II) sorption suggests electrostatic attraction between cadmium cations and negatively charged –COO- groups present on the peat surface.

Key words: adsorption isotherm model, non-linear regression analysis, Romanian peat

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