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SORPTION THERMODYNAMICS OF ORGANIC POLLUTANTS ONTO ZEOLITIC TUFF: ISOSTERIC AND STANDARD ENTHALPY

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The isotherms of sorption of six organic pollutants (benzyl alcohol, phenol, cyclohexanol, o-xylene, toluene and cyclohexane) from water solutions onto a zeolitic tuff (Si/Al ratio = 2.4) have been determined by batch experiments at 4; 14; 24 and 34°C. Sorbitivity (amount of solute sorbed per unit dry mass sorbent at the equilibrium) was very low for all molecules tested, particularly so for the hydroxyl compounds. Comparison of Freundlich parameters and the values of isosteric and standard enthalpy as determined in the present study with analogous data for immobilized humic acid and humic acid-zeolite adducts confirms that the sorbing properties of the adducts are not the sum of its components.

Keywords: organic pollutants, sorption, zeolitic tuff, standard enthalpy, isosteric enthalpy.

Introduction

This work is a part of a project whose purpose is the application of zeolitic tuffs and humic acid-zeolite tuff adducts for water purification from organic pollutants. Zeolites are natural aluminosilicates characterized by high surface area and high cation exchange capacity. The sorption properties of unmodified or surface-modified natural zeolites [1 – 2] and of synthetic zeolites [3] is a topic of increasing interest, because natural zeolites have a worldwide diffusion and very low cost, and synthetic zeolites with specific physico-chemical properties can now be produced at a relatively low cost.

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