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Heat of adsorption, adsorption energy and activation energy in adsorption and ion exchange systems

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ABSTRACT

The heat of adsorption, the adsorption energy and the activation energy are of the most important and frequently calculated parameters in adsorption and ion exchange systems. However, in many occasions these parameters are not clearly defined, appropriate calculated or analyzed in the related literature. A characteristic example is the use of different limits used in order to identify a process as physisorption, chemisorption or ion exchange. The present paper aims at clarifying the nature of these parameters and their interrelationship in theoretical basis and to present the paradigm of ion exchange systems involving zeolites and cations as a case study. All basic theoretical issues are presented, analyzed and discussed with the support of a large number of experimental data in order to draw secure conclusions on several critical issues. In total 46 activation energy, 32 adsorption energy and 34 heat of adsorption experimental values are collected and discussed.

Keywords: Heat of adsorption; Adsorption energy; Activation energy; Ion exchange systems; Zeolites; Clinoptilolite

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