



Kinetic modeling and isotherm study for naphthalene adsorption on boehmite nanopowder

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ABSTRACT

Boehmite was synthesized and characterized in order to study the adsorption behavior and possibility to remove naphthalene as one of the polycyclic aromatic hydrocarbons (PAHs) from industrial waste water. The removal of naphthalene was investigated in terms of various parameters namely: pH, operating time, initial concentration of naphthalene and weight of adsorbent using batch technique. The data showed that the adsorption of naphthalene onto boehmite is not affected by changes in the pH. Adsorption data of naphthalene on the boehmite nanopowder were analyzed according to Freundlich, Langmuir adsorption and Redlich–Peterson models. The data were found to be best described by the Freundlich model. The kinetics of the adsorption was found to be fitted with a pseudo second order model. The negative values for free energy indicated that the spontaneous nature of the adsorption with a high performance of naphthalene for boehmite and also negative values of the enthalpies indicated that the process is exothermic. The study presented revealed that boehmite can be a promising adsorbent for the removal of PAHs such as naphthalene.

Keywords: Naphthalene; Nanomaterial; Adsorption; Boehmite; PAH

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