Adsorption of heavy metal ions with modified diatomite from effluent

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Received 28 September 2017; Accepted 31 January 2018

\textbf{ABSTRACT}

Heavy metal ions pollution has become one of the most serious environmental problems today. Recently various methods for heavy metal ions removal from wastewater have been extensively investigated. These technologies include chemical precipitation, ion-exchange, adsorption, membrane filtration, coagulation–flocculation, flotation and electrochemical methods. Comparatively speaking, adsorption of inorganic non-metallic materials was recognized as an effective and economic method, such as activated carbon and diatomite. This work mainly discusses the properties of the diatomite and the modified diatomite and their application levels in treatment of wastewater containing heavy metal ions. The operating variables of modified methods and adsorption conditions were studied as well. The equilibrium was investigated as well. Results showed that the diatomite and the modified diatomite can adsorb the heavy metal ions efficiently, especially the modified diatomite. The adsorption of heavy metal ions by the diatomite was restricted by temperature and pH. Currently, the lower temperature and pH were, the less removal efficiency was achieved. After being treated with alkaline, the surface area of the diatomite was improved greatly which achieved better adsorption properties. The isotherms results revealed that the equilibrium data fitted the Langmuir model better. It confirmed the applicability of the diatomite as an efficient adsorbent and provided an attractive and low-cost process to remove hazardous materials.

\textit{Keywords:} Diatomite; Heavy metal ions; Adsorption; Equilibrium; Modified

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