

Adsorption process of heavy metals by low-cost adsorbent: a review

ABSTRACT

In this article, the potential of various low-cost adsorbents for the removal of heavy metals from contaminated water has been reviewed. Various conventional methods for heavy metal removal such as precipitation, evaporation, electroplating and also ion exchange have been applied since previous years. However, these methods have several disadvantages such as only limited to certain concentrations of metals ions, generation large amount of toxic sludge and the capital costs are much too high to be economical. Hence, adsorption using low-cost adsorbents is found to be more environmentally friendly. Adsorption is the alternative process, for heavy metal removal due to the wide number of natural materials or agricultural wastes gathering in abundance from our environment. High adsorption capacities, cost effectiveness and their abundance in nature are the important parameters which explain why the adsorbent is economical for heavy metal removal. In this review, a list of adsorbent literature has been compiled to provide a summary of available information on a wide range of low cost adsorbents for removing heavy metals from contaminated water. The application of available adsorption models such as the isotherm, kinetics and thermodynamics as well as the influence of parameters on metal adsorption by low cost adsorbent shall be reviewed to understand the adsorption mechanism of low-cost adsorbents.

Keyword: Adsorption; Heavy metals removal; Conventional methods; Low cost adsorbent