

INTRODUCTORY STUDY OF UTILIZING MONTMORILLONITE AS AN ADSORBENT IN AQUOUS SYSTEM

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Abstract

The aim of this study is to preliminarily investigate the feasibility of utilizing Montmorillonite as an adsorbent for removing both organic and inorganic toxicants from water. Montmorillonite is a smectite clay mineral based on bidimensional lamellar alumino-silicate structures leading to a naturally high surface area/volume ratio. Due to this reason, like zeolite, Montmorillonite has been proposed as an adsorbent in water treatment applications. Moreover, Montmorillonite is relatively abundant in certain parts of the world and thus it is inexpensive. Arsenic compound and humic acid were used as the studied adsorbates as they represented, respectively, the inorganic and organic forms of toxicants in aqueous system. Removal of the arsenic compound and humic acid from water by Montmorillonite were explored using a series of batch adsorption experiments. The quantities of humic acid and the arsenic compound in water were analyzed by UV-spectrophotometry. Furthermore, a detailed study addressing the effects of some important factors, such as the solution pH, the calcination temperature of Montmorillonite, the adsorbate initial concentration and time, on the adsorption process was investigated. The adsorption of arsenic compound and humic acid on Montmorillonite were found to be very sensitive to pH since pH can influenced both the characters of the adsorbate species and the Montmorillonite itself. The adsorption results demonstrate an interesting ability of Montmorillonite in separating both particular organic and inorganic toxicants from water. It is, therefore, shown by these experiments that Montmorillonite may be used as an alternative adsorbent in some specific water treatment processes.