



Arsenic removal from aqueous system using modified chestnut shell

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ABSTRACT

Natural adsorbent chestnut shell treated with FeCl₃ was prepared and employed by means of batch method for selective adsorption and removal of arsenic from aqueous system. The influences of different parameters, such as contact time, pH, temperature, and concentration of adsorbate, on adsorption performance of chestnut shell treated with FeCl₃ was studied in order to optimize the adsorption conditions. Batch adsorption studies have shown that removal capacity of chestnut shell can be increased by FeCl₃ treatment. The maximum adsorption capacity was found to be 0.885 mg g⁻¹ As(III) of chestnut shell, which was treated with FeCl₃. The adsorption data obtained follow a first-order rate expression and fit the Freundlich isotherm that has been used to obtain the thermodynamic parameters. In addition, the thermodynamic parameters, such as standard free energy (ΔG°), standard enthalpy (ΔH°), and standard entropy (ΔS°), of the adsorption process were calculated. It was found that the adsorption of arsenic on chestnut shell was exothermic. The adsorbents were characterized by scanning electron microscopy.

Keywords: Arsenic; Adsorption; Chestnut shell

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