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Adsorption of hexavalent chromium by metal organic frameworks from aqueous solution

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Abstract

A metal–organic frameworks (MOFs) based on copper-benzenetricarboxylates is applied to the adsorption of hexavalent chromium from aqueous solution. Characterization of Cu-BTC was achieved by XRD, SEM micrographs, nitrogen adsorption–desorption analysis and FT-IR spectra. The kinetic characteristics and thermodynamic parameters are also analyzed. The experimental isotherm data are analyzed using Langmuir and Freundlich isotherm equations. Thermodynamic parameters are calculated by the Gibbs free energy function, confirming that the adsorption process was spontaneous and accompanied by exothermic. The maximum removal has been achieved at pH = 7.0. Possible mechanism and adsorption behavior of hexavalent chromium onto Cu-BTC are investigated.

Keywords: Metal organic frameworks; Adsorption; chromium wastewater; Cu-BTC; Kinetic model; Langmuir isotherm

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