

Utilization Fe³⁺-modified zeolite (clinoptilolite & nano 4A) for the removal of Arsenic from aqueous solution

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Abstract

In this study, we have synthesized Fe (III)-modified zeolite (clinoptilolite & nano 4A) as efficient adsorbents for arsenic removal from drinking water. The prepared samples were characterized by x-ray diffraction (XRD), scanning electron microscopy (SEM) and TEM, to evaluate particle structure, size distribution and composition. Batch adsorption experiment was carried out to investigate the arsenic removal capability of the prepared adsorbents. It can be concluded that: (1) the presence of iron ions did not significantly affect the pore structure of the zeolites; (2) the comparisons between the adsorption isotherms of arsenic from aqueous solution onto the zeolites and modified zeolites showed that the modified ones behave an excellent capacity of adsorption arsenic than the unmodified ones; (3) 4A and its Fe(III)-modified form were effectively removed the arsenic species to achieve an arsenic level of three part per billion and below. The optimum conditions for removal of arsenic using zeolites were studied in order to apply it in industrial wastewater treatment.

Keywords: Fe(III)-modified zeolite, Clinoptilolite, 4A, Arsenic, Removal