REMOVAL OF Zn\textsuperscript{2+} IONS BY USING CLINOPTILOLITE-FE OXIDE

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Several industrial wastewater streams may contain heavy metals such as Sb, Cr, Cu, Pb, Zn, Co, Ni, etc. Including the waste liquids generated by metal finishing or the mineral processing industries. The toxic metals, probably existing in high concentrations (even up to 500 mg l\textsuperscript{-1}), must be effectively treated/removed from the wastewaters. If the wastewaters were discharged directly into natural waters, it will constitute a great risk for the aquatic ecosystem, whilst the direct discharge into the sewerage system may affect negatively the subsequent biological wastewater treatment [1, 2].

In this study a natural zeolite, clinoptilolite was used for the synthesis of a high surface area Clinoptilolite-iron oxide system, in order to be used for the removal of Zn ions. Fe-zeolite was obtained by adding natural clinoptilolite in an iron nitrate solution under basic conditions. Batch adsorption experiments were carried out to determine the effectiveness of the zeolite and zeolite-Fe system in removal of zinc. Adsorption experiments were conducted by mixing 0.5, 1 and 2 g of each of the substrates and different Zn concentrations (from 1 to 5 ppm) and mixing time. The maximum percentage adsorption of Zn reaches 97.86 % while the lowest is almost 49.52 %. For the present experimental conditions, the Zn adsorption capacity of zeolite was 87.69 mg/g, whereas of zeolite-Fe system was 100.12 mg/g. Results show that zeolite-Fe system is a favorable sorbant for metal ion removal from aqueous solutions and metal recovery.

References