Removal of *Escherichia coli* and heavy metals from aqueous solutions using silver-modified clinoptilolite

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Received 10 February 2014; Accepted 23 May 2014

**ABSTRACT**

The aim of this study was to investigate the removal of *Escherichia coli* and heavy metals (Pb²⁺, Cd²⁺ and Zn²⁺) from aqueous solutions using silver-modified clinoptilolite through the combined disinfection of *E. coli* by the silver ions and sorption of heavy metals on clinoptilolite. The silver-modified zeolites exhibited excellent disinfection performance with 100% removal of *E. coli* within 30 min. The as-received natural zeolites showed no disinfection characteristics under the same conditions. High metal removal efficiencies up to 92% were achieved with respect to the metals present in solution. In the *E. coli*-metals solution systems, disinfection was enhanced by the presence of metal ions which resulted in a relatively reduced amount of metals adsorbed by the zeolites due to the uptake of metal ions by the bacterial cells present in the solution. The results of this study demonstrate that silver-modified clinoptilolite has a potential for the simultaneous removal of metals and pathogenic organisms from contaminated aqueous streams.

*Keywords:* Silver-modified clinoptilolite; Disinfection; Adsorption; *Escherichia coli*; Heavy metals

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Presented at the 13th International Conference on Environmental Science and Technology (CEST 2013), 5–7 September 2013, Athens, Greece

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