

## Simultaneous removal of several heavy metals from aqueous solution by natural limestones

A. Sdiri, T. Higashi

Graduate School of Life and Environmental Sciences, University of Tsukuba. 1-1-1 Tennodai, Tsukuba, Japan

**Abstract.** Four natural limestone samples, collected from the Campanian-Maastrichtian limestones, Tunisia, were used as adsorbents for the removal of toxic metals in aqueous systems. The results indicated that high removal efficiency could be achieved by the present natural limestones. Among the metal ions studied,  $Pb^{2+}$  was the most preferably removed cation because of its high affinity to calcite surface. In binary system, the presence of  $Cu^{2+}$  effectively depressed the sorption of  $Cd^{2+}$  and  $Zn^{2+}$ . Similarly  $Cu^{2+}$  strongly competed with  $Pb^{2+}$  to limestone surface. In ternary system, the removal further decreased, but considerable amount of  $Pb^{2+}$  and  $Cu^{2+}$  still occurred regardless of the limestone sample. The same behavior was observed in quadruple system, where the selectivity sequence was  $Pb^{2+} > Cu^{2+} > Cd^{2+} > Zn^{2+}$ . From these results, it was concluded that the studied limestones have the required technical specifications to be used for the removal of toxic metals from wastewaters.

**Keywords:** Heavy metals, limestone, Sorption, Precipitation, Competitive effects, Wastewater.