

# Removal of $\text{Cu}^{2+}$ and $\text{Zn}^{2+}$ in Aqueous Solutions by Sorption onto Fly Ash and Fly Ash Mixtures

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KEYWORDS : Fly ash, sorption, metal ions, water treatment

## ABSTRACT

Several studies have pointed ash efficiency in the removal of heavy metal ions present in aqueous solutions. Contact time, pH and ash origin seem to be major operating parameters in the metal concentration control. The mechanisms of interactions between metal and solid are a function of pH and are found to be precipitation, adsorption or ion exchange as discussed in previous papers. The objectives of this work were to study the removal of  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$  in water by sorption onto fly ash and fly ash mixtures. The stability of the resulting cake was also approached in term of leaching capability. Experimental design methodology was used in order to identify influential parameters and to evaluate their interactions. Temperature, fly ash to ion concentrations ratio and ash quality were particularly studied. Two different ashes and a mixture of them were investigated. One of them has a very alkaline reaction in water and then allows, in the case of a mixture, to control the pH of the solution without lime addition. Final metal ion concentrations in solution, sorption capacity and ion leaching were determined. The results are discussed in order to get the optimal operating parameters in terms of ion control and industrial developments to remove and stabilize heavy metal ions present in wastewater.