

Abstract

Heavy metals can enter the ecosystem, among other forms, as divalent cations in the waste waters from industrial plants. One way of eliminating the ions from the waste waters is their absorption by polyelectrolyte hydrogels. In this bachelor thesis, the absorption of divalent cations of three different metals (calcium, nickel, copper) in a hydrogel based on polyacrylic acid is experimentally investigated. The absorption of ions is described by the hydrogel-solution partition coefficient. In this work, the partition coefficients are observed for varying concentrations of divalent ions. Furthermore, the type of ion-hydrogel interaction is determined, as well as some accompanying effects of hydrogel-solution interaction (water intake, pH change). Based on the distribution coefficients, it was determined that calcium is absorbed the most, followed by nickel and copper. Furthermore, it was determined that the calcium-hydrogel bond is electrostatic, while the nickel and copper ions form coordination bonds with hydrogel.

Keywords: heavy metals, hydrogel, divalent cations