

Swelling and metal ion uptake characteristics of kaolinite containing poly [(acrylic acid)-co-acrylamide] hydrogels

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ABSTRACT

Hydrogels of poly [(acrylic acid)-co-acrylamide], with N,NN-methylene bisacrylamide (MBA) crosslinker and different compositional ratios of kaolinite were prepared and investigated. The swelling characteristics of the hydrogels were investigated in distilled water as a function of clay content. The clay–hydrogel composite of 5.3% clay percentage showed a higher swelling property in distilled water relative to clay-free hydrogel. The swelling ratio was found to be affected by the change in contact time, pH, salt solution and temperature. The adsorption properties of the hydrogels towards Mn(II), Cu(II) and Zn(II) in aqueous solutions were also studied at different conditions. The rate of adsorption followed the pseudo-second-order kinetics. Elution behavior of loaded hydrogel (P3) was also studied in EDTA solution.

Keywords: Hydrogels; Acrylamide polymers; Swelling; Kaolinite; Adsorption; Metal ions

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