ABSTRACT

Hydrogels are investigated as an excellent material for the removal of contaminants from wastewater. They are polymeric structures with different functional groups that have high binding affinity for the contaminants. They can absorb large quantities of water and can be removed efficiently after adsorption which make them suitable for water treatment. Hydrogels synthesized from naturally occurring polymeric materials have low mechanical strength and their strength can be enhanced by incorporating different materials to them such as nanoparticles. Nanoparticles are used for the removal of pollutants from wastewater but they can be dispersed in water and cause secondary pollution. Nanoparticles are incorporated into hydrogels to make nanocomposites which are very effective for the removal of contaminants. Heavy metals are carcinogenic and have adverse effects on living organisms and their environment. In this work cadmium is removed by using nanocomposite hydrogels. Two types of hydrogels were prepared, ZnO-Chitosan nanocomposites and ZnO-Sodium alginate nanocomposite and their efficiency for the removal of Cd^{2+} was determined. The prepared hydrogels were characterized by using FTIR. The effect of concentration and adsorbent dose on removal percentage and adsorption capacity was determined. The maximum adsorption capacity was found out 11.2 mg/g for 400 ppm Cd^{2+} solution in case of ZnO-Chitosan nanocomposites and 8.5 mg/g for 400 ppm Cd^{2+} solution in case of ZnO-Sodium alginate nanocomposite.