ABSTRACT: This study investigates the removal of sulfide by using cobalt doped tin oxide nanoparticles entrapped in sodium alginate hydrogel matrix. Cobalt doped tin oxide nanoparticles were effectively synthesized by co-precipitation method, followed by entrapping them into sodium alginate solution and added dropwise into calcium chloride solution to convert them into beads. Different adsorption experiments such as effect of different initial concentration of solution, effect of different amount of hydrogel composites, effect of time, effect of temperature and effect of salt. Cobalt doped tin oxide sodium alginate-based hydrogel performed well in higher amount of hydrogel composite, low concentration of sulfide solution, mild and elevated temperature and in presence of magnesium chloride salt. The reaction has successfully followed second order kinetics. Iodometric titration was performed for the analysis of sulfide concentration in solution. It proved that cobalt doped tin oxide sodium alginate-based hydrogel is best adsorbent for the removal of pollutants form the wastewater. Nanoparticles and hydrogel composites were characterized by Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy (SEM)

KEYWORDS: sodium alginate hydrogel matrix; cobalt doped tin oxide nanoparticles; co-precipitation; water pollutants; sulfide.