Polyampholyte Hydrogel as a Potential Chromium Removal System

Dr. Sadia Nazneen Karobi
Independent University Bangladesh, Bashundhara R/A, Dhaka, Bangladesh

Abstract

Heavy metals e.g. chromium are one of the most widespread origin of industrial water pollution, because of their toxicity, non-biodegradable nature and accumulation in living organisms. Different treatment methods such as coagulation-filtration, ion exchange and membrane filtration are employed for the removal of chromium from water in producing drinking water. However, each of these treatment methods has some limitations and it is very often difficult to meet standards while applying these methods. The present work presents a new approach to remove chromium from water by employing a recently developed polyampholyte-based hydrogel that has wide range of applications as load bearing soft materials but according to author's knowledge its application in removing chromium has not been yet investigated. A systematic study on the adsorption efficiency of the hydrogel by varying hydrogel concentration (adsorbent dosage), contact time and initial chromium concentration was carried out. It was observed that the highest (about 90%) adsorption efficiency can be attained at 4 g per liter hydrogel concentration and 30 minutes' contact time. To further elucidate the adsorption mechanism, the adsorption equilibrium data were fitted using different adsorption isotherm models which clearly show that polyampholyte hydrogel has the potential to be a useful solution for removing chromium.