

Removal of hexavalent Chromium ions from aqueous solution by reduction at the surface of amine-functionalized nonporous and mesoporous silica nanoparticles with uniform nanopores

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Silica is a common mineral found in nature and has been widely employed in industrial fields. In particular, amorphous silica nanoparticles (ASNs) are one of the most common nanomaterials being used in many applications because of their good biocompatibility, facile synthesis procedure, relatively easy surface modification.

We are developing synthetic methods to prepare amine functionalized ASNs in order to use them to remove hexavalent Chromium ions from wastewater. We demonstrate highly monodispersed nonporous and mesoporous ASNs with average size 20 nm are obtained from our method. Furthermore, our method allows ASNs can be produced with uniform nanopores formed inside the nanoparticles developing a high specific surface area. We can also observe kinetic and isothermal spectra via time and concentration. These results on the formation and amine functionalization of ASNs and nanoporous ASNs, as well as use as a means for removing hexavalent chromium ions from aqueous solutions will be discussed.