OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference on
Nanotek and Expo

December 3-5, 2012 DoubleTree by Hilton Philadelphia Center City, USA

Adsorption of chromium (VI) for environmental water applications

T. Burks, M. Avilia, A. Uheida, M.S. Toprak and M. Muhammed
Division of Functional Materials, Royal Institute of Technology (KTH), Sweden

Recently published reports by the International Agency for Research on Cancer (IARC) depicted that chromium VI (Cr (VI)) has been deemed as a class-A human carcinogen as it has been one of the major contaminants associated with industrial waste water. Cr (VI) and other heavy metal pollutants can be extracted by several well-known methods such as ion-exchange, filtration and adsorption. Amongst these methods, adsorption offers significant advantages such as low-cost materials, ease of operation and efficiency in comparison to other conventional methods. Here we are reporting, the combination of adsorption method with magnetically assisted separation route to obtain efficient adsorption of Cr (VI) in aqueous systems. Super paramagnetic nanoparticles (SPION) coated with a suitable extractantprovides a robust system to remove Cr (VI) species. We synthesized SPION by the co-precipitation method followed by surface coating the extractant, bis (2, 4, 4-trimethylpentyl) dithiophosphinic acid (Cyanex-301) via mechanical agitation. X-ray Diffraction (XRD) was used to evaluate the purity and crystal structure of the synthesized material. Transmission electron microscopy (TEM) was performed to identify the morphology and particle size of SPION and Electron Dispersive X-ray spectroscopy (EDX) was employed to determine the presence of the extract ant. Several important parameters such as; the influence of pH, contact time, loading capacity and desorption was investigated for the removal and regeneration of Cr (VI). The obtained results at constant pH~2illustrates that 60% extraction of Cr (VI) species from the initial concentrated (8.3ppm) solution. The adsorption and desorption mechanism of Cr (VI) species is mainly due to the electrostatic interaction between the extract ant coated SPION and Cr (VI) species as a function of pH. Our developed procedure has demonstrated an effective use to extract the Cr (VI) contaminants from waste water systems.

terrance@kth.se