SYNTHESIS AND CHARACTERIZATION OF GOETHITE NANORODS FOR ARSENIC REMOVE FROM WATER

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The presence of arsenic in natural waters is a global problem and represents a significant potential risk to human health1. It is well known that arsenic is highly toxic and carcinogenic; at present, exist reports of diverse countries with arsenic concentrations in drinking water higher than those proposed by the World Health Organization (10 µg/L)2,3. It has been reported that adsorption strategies using iron oxyhydroxide are very efficient for the removal of arsenic in drinking waters4. However, the adsorption mechanism is not yet clear. In order to shed light on this subject, we attempted to study the interactions between arsenic species and ?-FeOOH nanorods in aqueous medium.

Goethite nanorods were prepared using a precipitation method. As-synthesized nanorods were put in contact with As2O3 and As2O5 solutions at room temperature at pH 4 and 7. Goethite particles were characterized by DRX, FT-IR, TEM, XPS and vibrational Magnetometry. Results showed that goethite nanoparticles had 30 nm wide and 410 mm long, and a narrow size distribution. Also, it was checked that at room temperature the nanoparticles exhibit paramagnetic behavior. The presence of arsenic on particles surface was confirmed, which is more remarkable when As(V) is employed. On the other hand, when As(III) species interact with the nanoparticle surface, oxidation to As(V) occurs, which produces the surface reduction. Besides, after adsorption experiment, it was evident from FTIR and XPS that once arsenic species interact with the nanoparticles, they form mono and bidentate surface complexes.

Keywords: arsenic, goethite nanorods, adsorption

References:


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