

# DOES THE CAPACITY REMOVAL OF AS(V) IMPROVE WITH THE INCORPORATION OF A SECOND METAL (CU) ON FE NANOPARTICLES?

**Pamela Sepulveda, C Flores, M A Rubio, A Garcia Garcia and N Arancibia-Miranda**

<sup>1</sup>Universidad de Santiago de Chile, Chile

<sup>2</sup>Laboratorio de síntesis y modificación de nanoestructuras y materiales bidimensionales, México

The use of Fe<sup>0</sup> nanoparticles (Fe NPs) has presented a great interest as adsorbent material. It has been extensively used for the decontamination of aqueous matrices. However, this material has some limitations when used in aqueous matrices and porous media, such as soil. To resolve these problems, the use of bimetallic nanoparticles (BNPs), specifically, FeCu BNPs had been reported, because this material has a higher reactivity, colloidal stability and removal rate compared with Fe NPs. The aim of this work was to synthesize and characterize Fe NPs and FeCu BNPs (different mass ratio of Fe-Cu), evaluating the incorporation of Cu on Fe NPs in the removal of As(V) present in aqueous matrices. The synthesis of nanomaterials was performed following the experimental procedure proposed by Wang & Zhang (1997). The change to the proposed synthesis was performed considering the simultaneous reduction of both metals, using NaBH<sub>4</sub> as a reducing agent. SEM images showed the formation of characteristic agglomerate of this magnetic material (Fe NPs). For FeCu BNPs, structure mix (pseudo spherical, amorphous and sheet) was observed. Besides, by XRD, peaks of Fe<sup>0</sup> for both materials and Cu<sup>0</sup> and oxide in FeCu BNPs, were identified. The sorption isotherm were carried out in batch system, working with 50 mg of nanomaterial and a solution of 200 mg/L As(V) (As<sub>2</sub>O<sub>5</sub>), 0.01 M NaCl (background electrolyte), pH 7, and stirred time of 5 hours. The Freundlich Model, which is characteristic of oxyanions that form multiple layers during the removal process, showed the best mathematical fit of the experimental data. FeCu BNPs showed better removal capacity than Fe NPs. In base on this study, the incorporation of Cu on Fe NPs, improves the removal capacity and therefore, this material can be applied as an adsorbent nanomaterial for As(V) abatement.

pamela.sepulvedaor@usach.cl