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## Synthesis and characterization of Fe<sub>2</sub>O<sub>3</sub>/CuO thin films for arsenic removal from water

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In this work, we prepared iron oxide/cooper oxide (Fe<sub>2</sub>O<sub>3</sub>/CuO) thin films by dip-coating due to this is a very simple and low-cost technique, which represents an efficient route to coat large surfaces. We fabricated these thin films by varying the number of layers deposited of CuO (4, 8, 12 and 16) on five layers of Fe<sub>2</sub>O<sub>3</sub> to examine the physical and electrical properties, and the adsorption of arsenic (As) from water. The Fe<sub>2</sub>O<sub>3</sub>/CuO thin films were deposited on fluorine-doped tin oxide (FTO) glass substrate by dip-coating in sol-gel solutions. The surface morphology was examined using field emission scanning electron microscopy (FE-SEM). The films were found to be denser at higher film thickness due to lesser porous observed on the surface. Phase analysis was carried out using X-ray diffraction (XRD). The results confirmed the tenorite and hematite phase for CuO and Fe<sub>2</sub>O<sub>3</sub> respectively. J-V characteristics of Fe<sub>2</sub>O<sub>3</sub>/CuO nanostructure under illumination at 100mWcm<sup>-2</sup> by using an AM 1.5 solar simulator provided short-circuit current density of 2.6mAcm<sup>-2</sup> and open circuit voltage of 0.28V under. The direct band gap energy was determined by a Tauc plot between 1.9 to 2.35eV. The resistivity (Four-point probe technique) show an increase when increase the number of layers. The adsorption of total as was investigated suggesting binding sites on the adsorbent surface. The maximum as adsorption capacity was 500ppb in 1hour at pH3.7. This work shows great potential for developing a cost-effective adsorbent for immobilization of arsenate using CuO/Fe<sub>2</sub>O<sub>3</sub> thin films.

### Biography

Elizabeth Carmen Pastrana Alta has completed her MS from Instituto de Química of Universidade de Sao Paulo-Brazil. Currently, she is pursuing her PhD at Universidad Nacional de Ingeniería (UNI), Perú. She is a Member of Advanced Materials Synthesis Research Group (GISMA) and is currently directs research projects from UNI (Faculty of Sciences and Research Institute). She won prize for the best publication awarded by CONCYTEC-Peru in 2016. She has published four papers in reputed journals and has been serving as a Member of the Bioinorganic Chemistry Society Board of Directors.

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