

II INTERNATIONAL SYMPOSIUM ON SCIENCE AND BIOTECHNOLOGY ENTREPRENEURSHIP AND INNOVATION

INSIGHTS INTO REDUCTION OF CHROMIUM(VI) BY COAL MINING WASTE

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Abstract

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Pyrite (PE) is a major coal mining waste product and natural sulfur mineral. The dissociation of PE tends to release dissolved ferrous and other ions, which upon reaction with atmospheric oxygen brings acidity to the natural water bodies. Stringent environmental regulations have called for alternatives to deal with tailing problems of mineral processing. Based on this concept, it is possible to take advantage of the “redox” characteristics of PE to treat wastes, such as Cr(VI) containing waste streams. In this work, PE, a coal mining waste, was evaluated as an iron source to promote the reduction of hexavalent chromium. PE was characterized physically-chemically and by x-ray diffraction. The adsorption phenomena on the coal mining waste was evaluated, and it was found that the PE has high adsorption potential. The effect of solution pH and catalyst PE dosage on the reduction rate of chromium(VI) to chromium(III) were studied in a batch system. It was observed that higher concentrations of PE resulted in an increase in the rate of Cr(VI) reduction. A maximum rate value at pH 3 was also observed. PE acts as a source of Fe(II), presents efficiency in the reduction of chromium(VI), so it can be an option in the treatment of wastewater.

Keywords: Pyrite. Reduction Reactions. Hexavalent Chromium.

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