

II INTERNATIONAL SYMPOSIUM ON SCIENCE AND BIOTECHNOLOGY ENTREPRENEURSHIP AND INNOVATION

PHOTOCHEMICAL REDUCTION OF CR(VI) FROM ELECTROPLATING WASTEWATER USING INDUSTRIAL STEEL WASTE AS IRON SOURCE.

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Abstract

The use of chromium in different industrial activities, such as electroplating, textile dyeing, leather tanning and metallurgy, results in toxic wastewaters containing chromium species, which must be treated before discharging into receiving waters. In this work, an industrial steel waste (mill scale found on all hot-rolled steel products) was evaluated as iron source to promote the reduction of hexavalent chromium species present in an electroplating wastewater. Mill scale (MS) was characterized by spontaneous magnetization, point of zero charge (pHpzc) and metal leaching. The efficiency of MS was studied in the presence and absence of reducing agents (citric acid and oxalic acid), and its stability and the influence of the homogeneous reaction on the overall efficiency was also evaluated using a batch system. Higher concentrations of MS resulted in an increase in the rate of Cr (VI) reduction. It was observed a negligible effect of citric acid and oxalic acid on Cr(VI) reduction in the absence of MS, however, in the presence of MS particles and organic acids, Cr(VI) reduction is significantly enhanced. It was verified that MS acts only as source of iron for the solution. The results indicate that MS can be used effectively in wastewater treatment, more precisely in Cr (VI) reduction.

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