

Treatment of Cr(VI) polluted wastewater by use of scrap iron, a cheap and locally available alternative electron source

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Abstract The reduction of Cr(VI) by use of a cheap and locally available industrial waste, scrap iron, was investigated in continuous system. The experimental results showed that, at the beginning of the column experiment, Cr(VI) was not detected in column effluent, which means that it was completely reduced. The greater the pH of column influent, the lower the time period before the breakthrough of hexavalent chromium in column effluent, excepting pH = 2.0 when the increased contribution of H⁺ ions to the corrosion of scrap iron leads to a rapid decrease in time of the scrap iron mass. After Cr(VI) breakthrough, its concentration in column effluent continuously increased in time until a steady-state value was observed. The behavior of Cr(III), Fe(II) and Fe(III) in column effluent was found to be, with minor exceptions, similar: the concentrations decreased, more or less rapid, in column effluent, until a steady-state value was observed. Experiments performed in this work confirmed the possibility of treating Cr(VI) polluted wastewater by using scrap iron as reducing agent.

Keywords: hexavalent chromium, toxic metals, scrap iron, reduction, wastewater treatment.
