Keywords Chromium ions; Fluidized bed; Heavy metal; Waste water; Biometallic; Electroplating

Introduction

Hexavalent and trivalent chromium are the stable form of presence of chromium in water. Cr(IV) is known to be carcinogenic and toxic; thus causing health problems e.g., vomiting, severe diarrhea, pulmonary congestions and liver damage. Whereas Cr (III) is less toxic [1,2] Cr(III) is essential in human nutrition (especially in glucose metabolism) [3-6]. Chromium ions are non-degradable and can accumulate in living tissue. Although some heavy metals in low dosage are essential micronutrients for plants and animals, in higher doses they can detrimentally a ect the health of most living organisms [7-9].

From economical aspect, the advantages of chromium applications in di erent industries [10,11], such as the production of stainless steel, in electroplating, refractory industry, tanning of leather, pigment and chemical industry, etc., contrast with its negative external e ects as a

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