Efect of Proces Parmetrs on Removalnd Recovery of Cd(I) and Cu(I) from Electroplating Wastewater by Fixed-bed Column of Nano-dimensional Titanium (IV) Oxide Aglomerates

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Abstract

Removal performances of Cd(II) and Cu(II) from water was investigated using agglomerated nanoparticle of hydrous titanium(IV) oxide (NTO) packed fixed bed. The parameters varied were the bed depth, flow rate and feed solution concentrations. Comparison of breakthrough volumes indicated that at pH 5.0, the removal performances of Cd(II) was better than Cu(II) and the maximum adsorption capacity are 44.12 and 41.96 mg.g-1 for Cd(II) and Cu(II), respectively. The breakthrough data described the Thomas, Yoon and the Bed Depth Service Time (BDST) models better than the Adams – Bohart model. The Thomas model column capacity (q0) for the Cd(II) was greater than the Cu(II) at any condition. The breakthrough time (tb) of BDST model increased with increasing bed depth of NTO columns. A fixed bed of NTO column treated the Cd(II) and Cu(II) contaminated industrial wastewater successfully. The metals were recovered as their oxides from the column regeneration effluent solution.