



Adsorption of direct yellow 27 from water by poorly crystalline hydroxyapatite prepared via precipitation method

Khalid Mahmud^a, Md. Azharul Islam^b, Anastasios Mitsionis^a, Triantafillos Albanis^a, Tiverios Vaimakis^{a,*}

^aDepartment of Chemistry, University of Ioannina, Ioannina 45110, Greece

Tel. +30 2651008352; Fax: +30 2651008795; email: tvaimak@cc.uoi.gr

^bForestry and Wood Technology Discipline, Khulna University, Khulna 9208, Bangladesh

Received 5 July 2011; Accepted 9 January 2012

ABSTRACT

In the present study, hydroxyapatite powders were prepared by modified precipitation method and characterized by XRD, FT-IR and N₂ adsorption–desorption techniques. The prepared nonporous particles were organized to agglomerate with mesoporous structure and consisted of low crystallinity Ca-deficient hydroxyapatite and in amorphous phase. The commercial direct yellow 27 was selected as a model dye in order to examine the adsorption capacity of hydroxyapatite at room temperature. The adsorption isotherms are transformed from L-type to S-type curve, in Giles classification, by increasing the pH values. Equilibrium data fitted very well to the Langmuir model, signifying the energetic homogeneity of hydroxyapatite surface adsorption sites. The dye sorption kinetics was fairly described by the pseudo-first-order kinetic model.

Keywords: Hydroxyapatite; Direct yellow 27; Adsorption kinetics; Adsorption isotherms

*Corresponding author.