



Kinetic models for the electrochemical decolouration of two reactive azo dyes

Víctor López-Grimau^{a,b}, Montserrat Pepió^c, Carmen Gutiérrez-Bouzán^{a,*},
Valentina Buscio^a

^a*Institute of Textile Research (INTEXTER), Universitat Politècnica de Catalunya – Barcelona Tech, Terrassa, Spain, emails: m.carmen.gutierrez@upc.edu (C. Gutiérrez-Bouzán), victor.lopez-grimau@upc.edu (V. López-Grimau), valentina.buscio-olivera@upc.edu (V. Buscio)*

^b*Department of Project and Construction Engineering, Universitat Politècnica de Catalunya – Barcelona Tech, Terrassa, Spain*

^c*Department of Statistics and Operations Research, Universitat Politècnica de Catalunya – Barcelona Tech, Terrassa, Spain, email: montserrat.pepio@upc.edu*

Received 5 April 2018; Accepted 2 August 2018

ABSTRACT

In this work, the indirect oxidation of two azo dyes (Colour Index Reactive Orange 4 and 13) was performed in an electrochemical batch cell in the presence of chloride as an electrolyte. The effect of different operational parameters on the electrochemical treatment was tested. Kinetic plots consisting of two linear portions were obtained in some experiments. The rate constants and the breaking point between the two linear portions were modelled to evaluate the influence of dye concentration, conductivity and pH. Good correlation between the experimental and the modelled constants and breaking points was observed. Models showed that the dye concentration is the most significant factor in the electrochemical treatment of both dyes, although conductivity and pH were also significant either individually or in interaction with other factors.

Keywords: Electrochemical oxidation; Reactive dyes; Decolouration rate; Kinetic models; Factorial experimental design

* Corresponding author.