

Characteristics of a Dye-Entrapped Polypyrrole Film Prepared in the Presence of a Different Dye

Authors : M. Mominul Haque, Danny KY. Wong

Abstract : In this paper, we will demonstrate the feasibility of selectively removing the azo dye, Acid Red 1, in the presence of a second dye, Indigo Carmine, at conducting polypyrrole films. A long-term goal of this work is to develop an efficient and effective electrochemical treatment of textile effluents that does not yield any toxic by-products. Specifically, pyrrole was initially electrochemically oxidised in the presence of Acid Red 1 to prepare an Acid Red 1-entrapped polypyrrole film. Next, the Acid Red 1 entrapped film was electrochemically reduced to expel the dye from the film. The film was then ready for use in removing the dye in an Acid Red 1 solution. The entrapment efficiency of the film was then studied by spectroscopically determining the change in the absorbance of the dye solution. These experiments were repeated using Indigo Carmine or a mixture of Acid Red 1 and Indigo Carmine, in place of Acid Red 1. Therefore, this has given rise to an environmentally friendly treatment method for textile effluents. In our work, we have also studied the characteristics of Acid Red 1- and Indigo Carmine-entrapped polypyrrole films by scanning electron microscopy, X-ray diffraction and Fourier transfer infrared spectroscopy.

Keywords : azo dye, electrochemical treatment, polypyrrole, Acid Red 1

Conference Title : ICMSE 2015 : International Conference on Materials Science and Engineering

Conference Location : Paris, France

Conference Dates : January 23-24, 2015