



Electrochemical Degradation of 9-(2-Carboxyphenyl)-6-(diethyl amino)-N, N-diethyl-3H-xanthen-3-iminium chloride Dye at Sn/graphite Modified Electrode in Aqueous Solution

H. C.Charan Kumar^{1*}, S. Rajendra Prasad², M. Harsha¹, R. Shilpa³ and S. Ananda³

1. Department of Chemistry, PES College of Engineering Mandya 571401, Karanataka, **INDIA**
 2. Department of Chemistry, Davangere University, Shivagangotri, Davangere, Karanataka, **INDIA**
 3. Department of Studies in Chemistry, University of Mysore, Manasagangotri, Mysuru, **INDIA**
- E-mail : charan1424dec@gmail.com

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ABSTRACT

The main aim of this research is to develop a systematic method for the electrochemical degradation of Rhodamine-b dye from its aqueous solution by synthesized Sn/graphite modified electrode. It can be used to investigation of waste water containing Rhodamine-b. It indicates that the Sn/graphite modified electrode had very good catalytic activity. The deposited Sn/graphite modified electrode was applied to electrochemical degradation of Rhodamine-b dye solution. It gives the comparison between the kinetics of degradation by graphite and Sn/graphite modified electrode. On the basis of the effect of Rhodamine-b dye concentration, pH, current density and different temperature, degradation rate is to be studied. UV-Visible spectra before and after degradation of dye was measured. The anodic oxidation by Sn/graphite modified electrode showed the complete degradation of aqueous solution Rhodamine-b, which is confirmed by UV-Visible and COD measurements. This process is one of the advanced oxidation processes (AOPs). It generates hydroxyl free radicals ($\cdot\text{OH}$) which attack the dye molecules, resulting in degradation of the dye molecules. The thin film formation of Sn or encapsulated in graphite rod is observed from SEM/EDAX. The ICE values of different experimental conditions are calculated. These results indicated that the Sn/GME would be promising anode for electrochemical degradation of Rhodamine-b. This dye is converted into CO_2 , H_2O and simpler inorganic salts. This method can be applied for the remediation of waste water containing organics, cost effective and simple.

Graphical Abstract

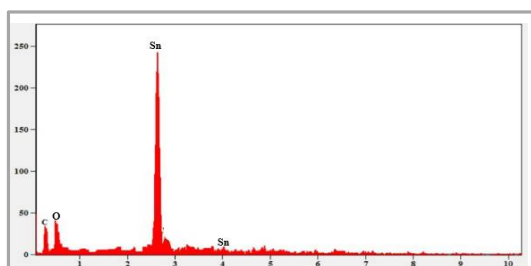


Figure 12(B). EDAX spectra of Sn/GME

Keywords: Rhodamine-b, Stannous graphite modified electrode (Sn/GME).