Short Communication

The Electrocatalytic Activity of Polyaniline/TiO₂ Nanocomposite for Congo Red Degradation in Aqueous Solutions

Khadija M. Emran^{1*}, Shimaa M. Ali^{1,2}, Aishah L.L. Al-Oufi¹

¹ Department of Chemistry, Faculty of Science, Taibah University, Madinah 30002, KSA

² Department of Chemistry, Faculty of Science, Cairo University, Giza 12613, Egypt

*E-mail: kabdalsamad@taibahu.edu.sa, dr_shimaaali80@yahoo.com

doi: 10.20964/2018.05.38

Received: 29 January 2018 / Accepted: 8 March 2018 / Published: 10 April 2018

A nano-composite of polyaniline with TiO₂ (PANI/TiO₂) is prepared using the chemical oxidative polymerization method. The prepared composite is characterized using x-ray diffraction (XRD), transmission and scanning electron microscopes (TEM and SEM), Fourier transform infrared spectroscopy (FTIR), and thermal analysis. XRD and TEM reveal the formation of the orthorhombic phase of PANI/TiO₂ with an average particle size of 8 nm. The FTIR spectrum of the nano-composite shows the presence of characteristic oxide peaks in addition to PANI peaks. Thermal analysis confirms the increased thermal stability of PANI after composite formation. The PANI/TiO₂ composite has been used as a catalyst for Congo red degradation using electrochemical oxidation. Several parameters which affect the percent removal are studied such as pH, electrolysis time, applied current density, and initial dye concentration. The optimum conditions for obtaining the highest possible removal efficiency were determined.

Keywords: polyaniline; titanium oxide; nano-composite; organic dyes; electro-oxidation

[FULL TEXT](#)

© 2018 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).