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Environmental Remediation of Organic Pollutants in Synthesized and Characterized Aqueous Suspension by Photochemical Method: A Kinetic Study

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Abstract

Comparative study of the of azo Dyes (as a class important organic pollutants photodegradation process) in aqueous solution employing H_2O_2/UV and $K_2S_2O_8$/UV systems in a photochemical reactor were investigated. Lead zirconate titanate [Pb ($Zr_{0.58}Ti_{0.42}$) O_3] (PZT) nanocatalyst was synthesized via the sol-gel method. Then, photocatalytic properties of dopant type on PZT were determined in a UV photoreactor in the presence of different radical generators. These comparative studies showed that PZT/TiO_2 and PZT/TiO_2/$FeCl_3$ have higher efficiency than the others.

Key words*: PZT; Photodegradation; Photocatalytic; Azo dye; Nanocatalyst.*

Introduction

Dye pollutants from the textile industries are the major source of environmental contamination. Azo dyes, being the largest group of synthetic dyes, constitute up to 70% of all the known commercial dyes produced [1]. These dyes are widely used in textile, plastic, leather, and paper industries as dying agents. Highly substituted aromatic rings joined by one or more azo groups characterize their chemical structures. Being released into the environment, these dyes not only are important colors to water sources but also damages living organisms by stopping the reoxygenation capacity of water, blocking sunlight, and therefore disturbing the natural growth activity of aquatic life [2]. Thus, color removal from textile waste water has been a matter of considerable interest for long time. In order to treat waste waters, conventional biological and physical methods such as adsorption and reverse osmosis do not degrade organic pollutants but chemical methods such as advanced oxidation process (AOPs) seem more promising. However, it is desired to examine destructive technologies

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