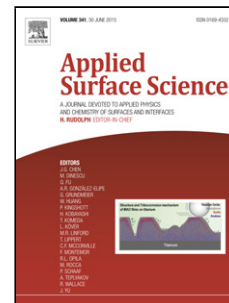


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Photocatalytic degradation of brilliant green using undoped and Zn doped SnO<sub>2</sub> nanoparticles under sunlight irradiation

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## Abstract

We formulate a simple chemical precipitation method for the preparation of undoped and Zn doped SnO<sub>2</sub> nanocrystals. The X-ray diffraction (XRD) patterns revealed the crystalline nature of the prepared products. The diffusion reflectance spectra (DRS) show the optical properties and confirmation made by photoluminescence (PL) results. The scanning electron microscope (SEM) and transmission electron microscopic (TEM) results discussed more regarding the morphologies of the products. The photocatalytic performance of SnO<sub>2</sub> studied by the degradation of brilliant green showed excellent activity on 0.075 M of zinc doping due to its reduced crystallite size and high surface area.

Keywords: SnO<sub>2</sub>, tetragonal, photocatalytic, brilliant green, charge carriers.

## Introduction

In recent decades, there has been extensive interest in developing semiconductor photocatalysts with high activities for environmental applications such as air purification, water disinfection, hazardous waste remediation, and water purification [1]. Among various semiconductors such as TiO<sub>2</sub> [2], and ZnO [3,4], SnO<sub>2</sub> [5,6] has been known as the leading photocatalyst due to its good photoactivity, low cost, and high chemical stability. Tin oxide (SnO<sub>2</sub>), an n-type semiconductor material with a band gap of nearly 3.6 eV [7], finds its potential applications in photocatalysis [8] and photodetection [9]. Usually, the properties of nanosized metal oxide materials depend on size, band gap and morphology that in turn depend on the method of preparation used. For the synthesis of metal oxide nanoparticles, different methods such as sol-gel [10], spray pyrolysis [11], hydrothermal routes [12] and co-precipitation method are used [13]. Among these methods, simple chemical precipitation is a suitable one due to its uncomplicated synthesis procedure, low reaction temperature and short reaction time.

The photocatalytic degradation is a likely choice for the treatment of wastewater polluted with organic compounds. Brilliant Green (BG), the organic dye plays its role in the field of medicine,

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