

Highly efficient photocatalytic activity of Ag₃VO₄/WO_{2.72} nanocomposites for the degradation of organic dyes from the ultraviolet to near-infrared regions

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Abstract

Full-spectrum light-driven Ag₃VO₄/WO_{2.72} nanocomposites were prepared using a simple precipitation method. The nanocomposites were characterized via X-ray diffraction (XRD) analysis, field-emission scanning electron microscopy (FE-SEM), ultraviolet-visible (UV-Vis) spectroscopy, X-ray photoelectron spectroscopy (XPS), transmission electron microscopy (TEM), photoluminescence (PL) spectroscopy, Brunauer-Emmett-Teller (BET) analysis, and electrochemical impedance spectroscopy (EIS). The photocatalytic performance of the nanocomposites for the photodegradation of methylene blue (MB) and Rhodamine B (Rh B) were examined. The Ag₃VO₄/WO_{2.72} nanocomposites exhibited outstanding photocatalytic performance for the photodegradation of Rh B and MB, and they were arly high photodegradation efficiency. AgV-WO-2 photodegrastable under irradiation with UV, visible, near-infrared (NIR), and solar light. A nanocomposite prepared with Ag₃VO₄ and WO_{2.72} in a 1:2 molar ratio (AgV-WO-2) exhibited particulded 99% of the Rh B and 98% of the MB in aqueous solutions under solar and visible light. Under UV light, 96% of the Rh B and 89% of the MB were degraded, while 40% of the Rh B and 38% of the MB in solutions irradiated with NIR light were removed.

Biography:

My name is Kebena Gebeyehu Motora. I have studied Bachelor of Science in Chemistry at Jigjiga University from 2008–2011 and graduated on 2nd July, 2011. I have studied my Masters in Jimma University from Sep 2011 to Nov 2013 and graduated by masters of Science in Analytical Chemistry. After graduation I was employed at Mettu University and I have been working there as a lecturer and researcher until September 2017. Starting from September 2017, I am studying my Ph. D at National Taiwan University of Science and Technology and I will graduate this year.

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