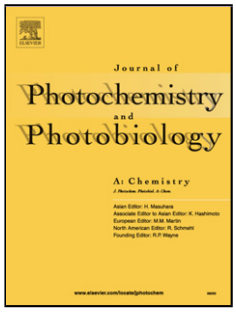

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PII: S1010-6030(18)30740-8
DOI: https://doi.org/10.1016/j.jphotochem.2018.08.013
Reference: JPC 11426

To appear in: *Journal of Photochemistry and Photobiology A: Chemistry*

Received date: 30-5-2018
Revised date: 30-7-2018
Accepted date: 11-8-2018

Please cite this article as: Askari P, Mohebbi S, Do T-On, High performance plasmonic activation of Ag on β-Ag_2WO_4/$BiVO_4$ as nanophotocatalyst for oxidation of alcohols by incident visible light, *Journal of Photochemistry and amp; Photobiology, A: Chemistry* (2018), https://doi.org/10.1016/j.jphotochem.2018.08.013

High performance plasmonic activation of Ag on β-Ag_2WO_4/$BiVO_4$ as nanophotocatalyst for oxidation of alcohols by incident visible light

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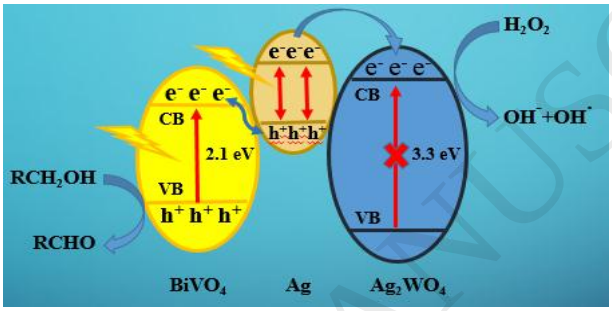
Graphical abstract

Plasmonic nanophotocatalyst Ag/β-Ag_2WO_4/$BiVO_4$ with high photocatalytic performance toward alcohols oxidation upon visible light incident



Research highlight

- Synthesis a novel and stable plasmonic nanophotocatalyst Ag/β-Ag_2WO_4/$BiVO_4$ by a facile method
- A nanocomposite with excellent charge transfer and charge separation in photo process
- High photocatalytic performance toward aldehyde producing under visible light irradiation
- High and constant photoelectrochemical current at low applied potential with efficient surface plasmon resonance upon light absorption
- A plausible photocatalytic mechanism through photo generated holes and $OH^{\bullet}$ radicals

Abstract

A new and high efficient ternary Ag on β-Ag_2WO_4/$BiVO_4$ as a visible light driven nanophotocatalyst toward oxidation of alcohols was synthesized by the ultrasonic irradiation in combination with hydrothermal decomposition method. This photosensitive catalyst was characterized using FT-IR, FE-SEM imaging, TEM, EDS, XRD, XPS, UV-Vis, PEC and PL techniques. The photocatalytic performance of this nanocomposite is more than 90% conversion that significantly is higher than either pure Ag/β-Ag_2WO_4 or $BiVO_4$ nanoparticles. This such high activity is related to efficient charge separation that could be contributed to the fast charge transfer