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## Visible-light-driven Pd doped $\beta$ - $\text{Bi}_2\text{O}_3$ nanocomposite: an affordable and an efficient catalyst for mitigation of noxious pollutant(Article)

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### Abstract

A series of surface plasmonic effect induced by Pd anchored  $\beta$ - $\text{Bi}_2\text{O}_3$  flower-shaped nanocomposite photocatalysts were prepared by the facile hydrothermal method. The crystallinity of the synthesized Pd loaded  $\beta$ - $\text{Bi}_2\text{O}_3$  nanocomposites is analyzed by powder X-ray diffraction analysis and the morphology and element presence of the synthesized Pd loaded  $\beta$ - $\text{Bi}_2\text{O}_3$  nanocomposites were characterized by field-emission scanning electron microscopy, transition electron microscopy and energy dispersive X-ray analysis. The optical properties of the synthesized Pd loaded  $\beta$ - $\text{Bi}_2\text{O}_3$  nanocomposites are analyzed by ultraviolet–visible diffuse reflection spectroscopy. The 2% Pd loaded  $\beta$ - $\text{Bi}_2\text{O}_3$  composite has higher photocatalytic activity in methylene blue degradation in visible irradiation than immaculate  $\beta$ - $\text{Bi}_2\text{O}_3$  and other Pd loaded  $\beta$ - $\text{Bi}_2\text{O}_3$  nanocomposites. The effect behind the improvement of photocatalytic activity of the 2% Pd loaded  $\beta$ - $\text{Bi}_2\text{O}_3$  composite is the surface plasmon resonance effect of Pd NPs and also interdependent bonding interaction between Pd and  $\beta$ - $\text{Bi}_2\text{O}_3$ . Moreover, the radical trapping experiment substantiates that  $\cdot\text{OH}$  and  $\text{O}_2^{\cdot-}$  play a vital role in MB abatements. The present work provides new deep insights into the intriguing other plasmonic photocatalytic materials with potential applications in the area of environmental indemnification. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH, DE part of Springer Nature.

### Author keywords

[Pd@ \$\text{Bi}\_2\text{O}\_3\$](#)  [Photocatalyst](#) [Photodegradation](#) [Surface plasmon](#) [Visible light](#)

### Indexed keywords

Engineering controlled terms:

[Complexation](#) [Crystallinity](#) [Energy dispersive X ray analysis](#) [Field emission microscopes](#)  
[Morphology](#) [Nanocomposites](#) [Optical properties](#) [Photocatalytic activity](#) [Plasmons](#)  
[Scanning electron microscopy](#) [Surface plasmon resonance](#) [X ray powder diffraction](#)

Engineering uncontrolled terms

[Bonding interactions](#) [Diffuse reflection spectroscopy](#)  
[Field emission scanning electron microscopy](#) [Methylene blue degradations](#)  
[Photocatalytic materials](#) [Powder X ray diffraction](#) [Surface plasmon resonance effects](#)  
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[Bismuth compounds](#)

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Cited by 5 documents

Mane, V. , Dake, D. , Raskar, N.  
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