

Bismuth Ferrite-Graphene Nanocomposite as an Efficient Visible-Light Photocatalyst

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INTRODUCTION

BFO has:

- ❑ A rhombohedral distorted perovskite structure.
- ❑ Unique electrical, optical, and magnetic properties.
- ❑ Visible-light photocatalytic behaviour.
- ❑ High recombination rate of electron/hole.

GO:

- ❑ Two-dimensional material with hexagonal crystalline structure.
- ❑ Outstanding charge mobility, electrical conductivity, and specific surface area.
- ❑ High absorption capacity for pollutants.
- ❑ Suitable electron acceptor to reduce the recombination of electrons and holes.

OBJECTIVES

- ❑ Compositing GO with BFO nanoparticles by a novel sol-gel method.
- ❑ Characterizing properties of nanocomposite.
- ❑ Improve BFO visible-light photocatalytic activity.

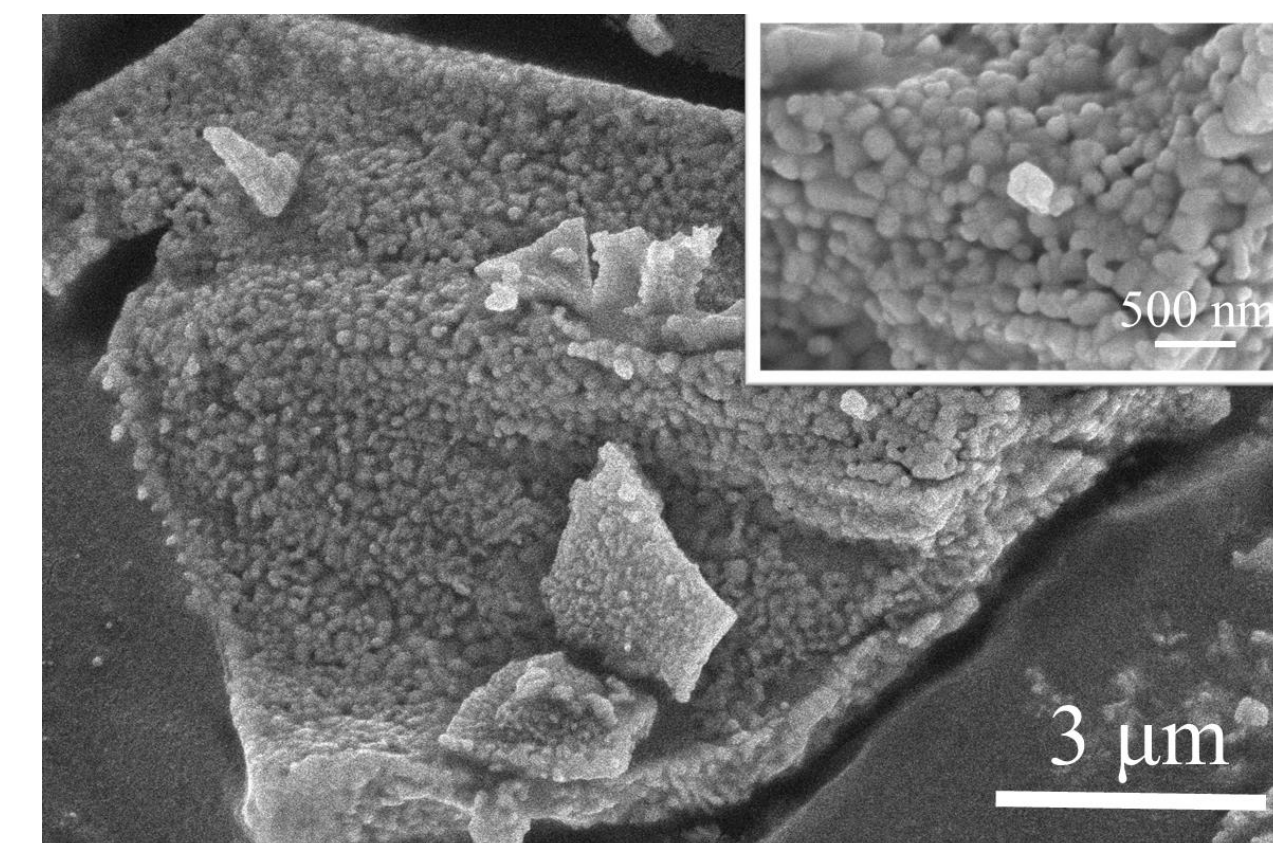
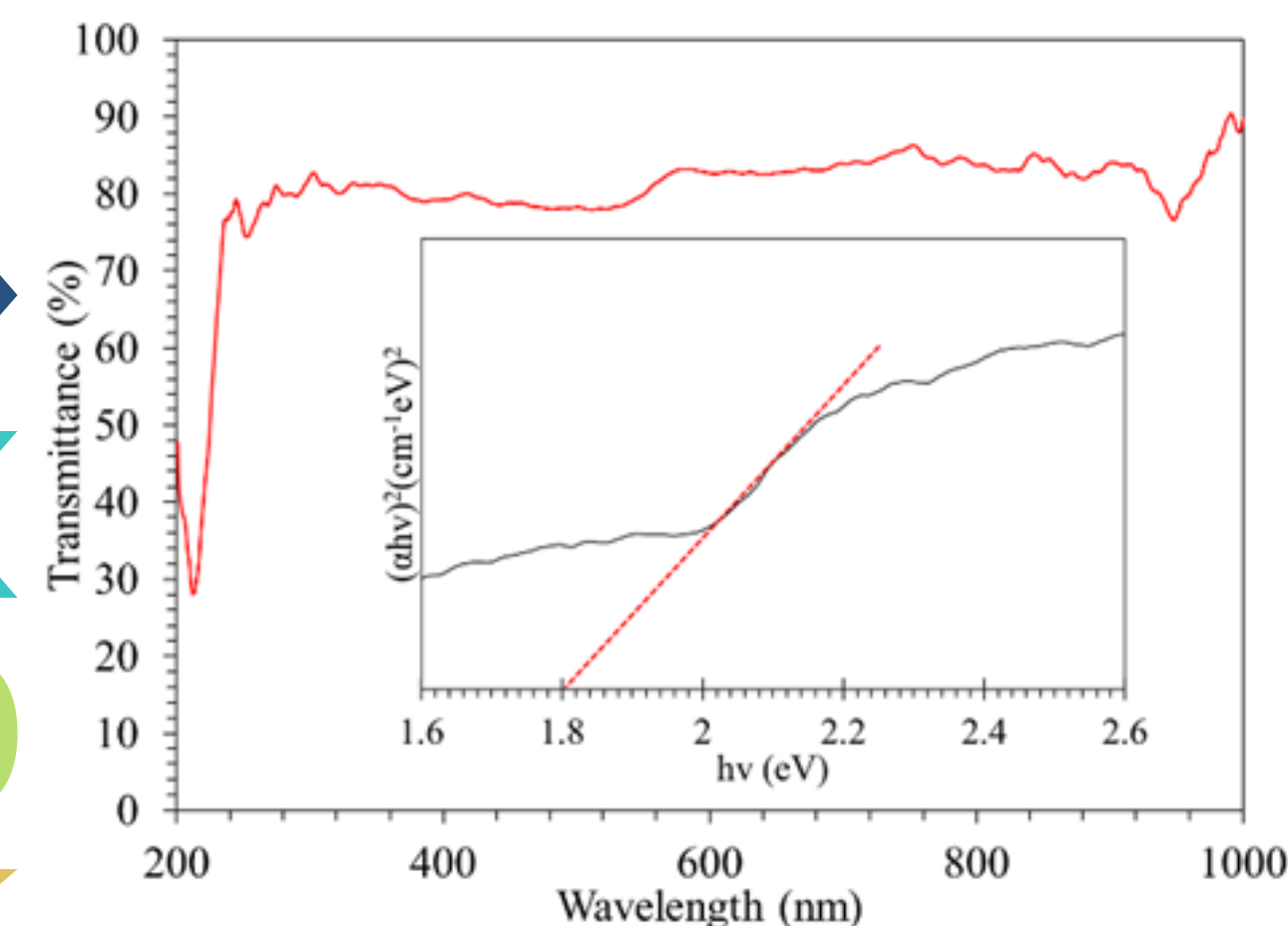
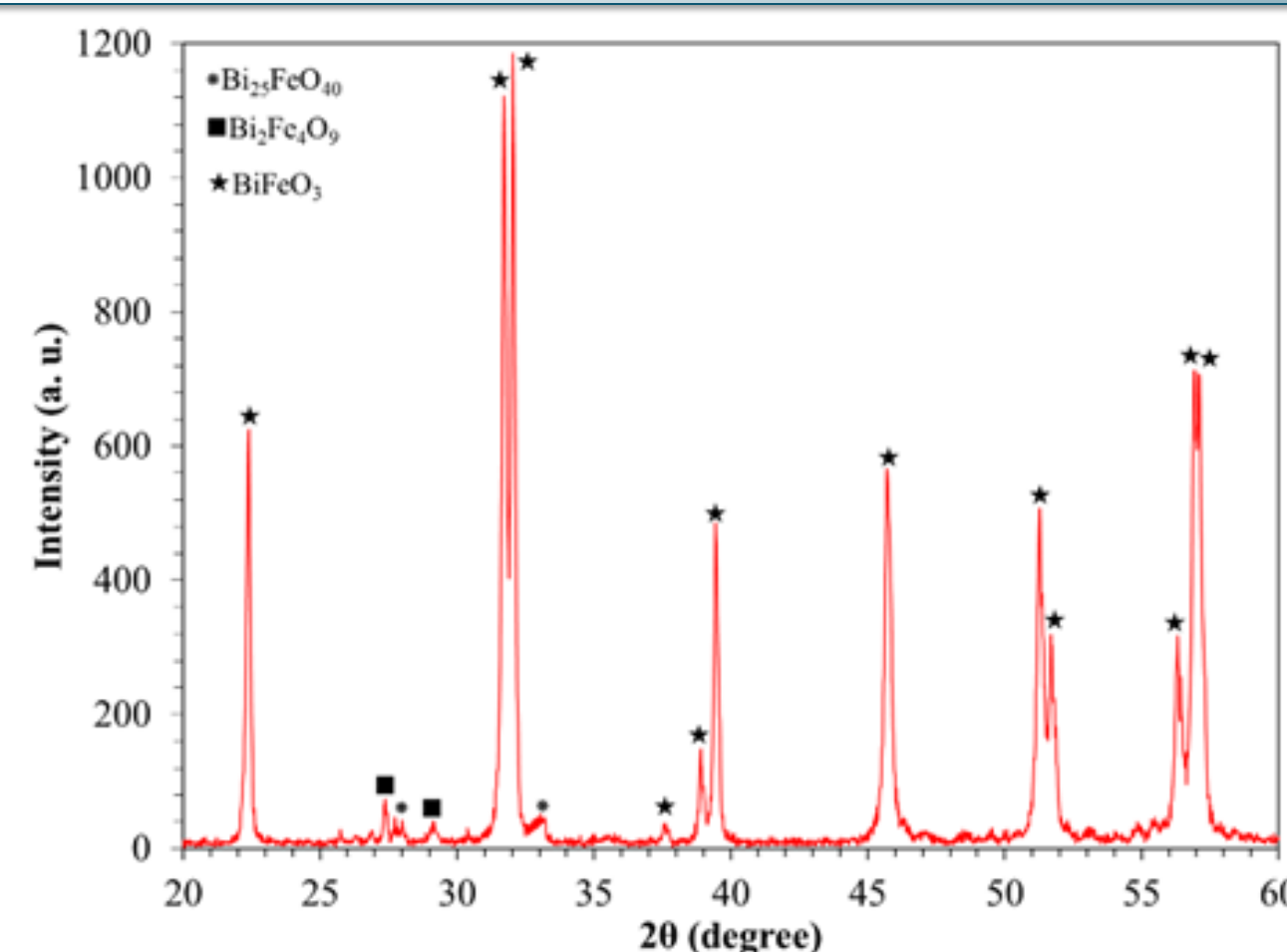
Degradation of Methylene Blue to harmless products like CO₂.

MATERIALS AND METHODS

- 01 Precursors: Bi(NO₃)₃·5H₂O, Fe(NO₃)₃·9H₂O
Solvents: C₃H₈O₂, C₂H₄O₂, C₄H₁₁NO₂
- 02 Precursors were dissolved in solvents at room temperature and stirred for 1 h.
- 03 The GO powder was sonicated for 30 min and mixed with previous solution to achieve sol
- 04 After 2 h, the transparent gel was obtained and then was dried at 60 °C for 30 minutes.
- 05 Annealed in a tube furnace for 1 h at 600 °C in an Ar atmosphere by 5 °C min⁻¹ heating rate

RESULTS

XRD, UV-VIS DRS, FESEM, Photocatalytic degradation, and the kinetics of photocatalytic degradation of MB by BFO-GO nanocomposite are shown as follow:



CONCLUSION

- The crystalline rhombohedral perovskite structure of the BFO is formed.
- BFO nanoparticles have a spherical shape and are grafted on GO nanosheets.
- The band gap of BFO is measured 1.8 eV.
- The BFO-GO nanocomposite can degrade methylene blue up to 70%.

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