



One-pot sono-enhanced EG/EtOH-thermal design of nano-structured bismuth oxide formate and bismuth molybdenum oxide and their competitive evaluation in hetero-photocatalytic deletion of RhB under simulated sunlight

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Abstract:

By the development of industries, the amount of organic pollutants has also increased in the environment significantly. Dye contaminants which are more resistant are one of them. To tackle this issue, various forms of techniques are applied, but the photocatalytic approach has attracted a lot of attention as one of the most environmentally friendly method. In the present study, bismuth oxide formate (BiOCCOOH) and bismuth molybdenum oxide (Bi₂MoO₆) nanophotocatalysts have been prepared by one-pot sono-enhanced EG/EtOH-thermal synthesis for elimination of rhodamine B (RhB) under simulated sunlight. In comparison to the previous works, as-synthesized BiOCCOOH showed higher photodegradation potential towards RhB pollutant owing to the effect of ultrasound wave. Herein, BiOCCOOH could degrade 10 mg/L RhB up to 96.91% unexpectedly during 120 min under simulated sunlight. But, the decolorization capability of Bi₂MoO₆ over 10 mg/L RhB was calculated to be 68%. Moreover, BiOCCOOH and Bi₂MoO₆ as layered nanophotocatalysts has shown unique morphologies due to the presence of two solvents (ethylene glycol and ethanol) and the use of ultrasonic waves during synthesis which affected the growth of crystals and their sizes. Moreover, crystallographic and morphological analyses are used to demonstrate the true synthesis of nanophotocatalysts and the discussion of results gained.

Biography:

Mahdiyeh Mohammadzadeh is M.Sc. student in Chemical engineering and Catalysis at Sahand University of Technology. She holds a B.Sc. in Chemical engineering from the same university and her degree was awarded in Sept. 2013. She has been working in the Reactor and Catalysis Research Center (RCRC) at Sahand University of Technology since 21 January 2019. She is keen to research in the areas of catalysts under supervision of Professor



Mohammad Haghghi. Her research focuses on synthesis of photocatalysts for environmental applications and water treatment. After completing her undergraduate degree, she worked as an English language teacher at Alef institute (www.alef-site.ir) from 2016 to 2018. In spite of her interest in teaching English, she decided to continue her graduate studies. Currently, she is the top student of her master's class. Mahdiyeh is going to pursue a Ph.D. program as soon as completion of her master's next year.

Publication of speakers:

1. Shijie Li, Shiwei Hu, Wei Jiang, Kaibing Xu, One-pot solvothermal synthesis of Ag nanoparticles decorated BiOCCOOH microflowers with enhanced visible light activity, *Materials Letters* 196 (2017) 343–346.
2. Mingyi Zhang, Changlu Shao, Jingbo Mu, Zhenyi Zhang, Zengcai Guo, Peng Zhang and Yichun Liu, One-dimensional Bi₂MoO₆/TiO₂ hierarchical heterostructures with enhanced photocatalytic activity, *CrystEngComm*, 2012, 14, 605.
3. Shiwei Hu, Shijie Li, Kaibing Xu, Wei Jiang, Junlei Zhang, Jianshe Liu, MWCNTs/BiOCCOOH composites with improved sunlight photocatalytic activity, *Materials Letters* .2016.12.077.

Frontiers in Catalysis and Chemical Engineering, Amsterdam, March 23-24, 2020

Citation: Mahdiyeh Mohammadzadeh; One-pot sono-enhanced EG/EtOH-thermal design of nano-structured bismuth oxide formate and bismuth molybdenum oxide and their competitive evaluation in hetero-photocatalytic deletion of RhB under simulated sunlight; *Euro Catalysis* 2020; March 23, 2020; Amsterdam, Netherlands.