22nd Iranian Inorganic Chemistry Conference,
23-25 August, 2023
University of Kurdistan

Decolorization of MB dye by Cobalt(II,III) oxide QDs linked to silver molybdate as an impressive heterojunction photocatalyst under the irradiation of visible light

Mahdieh Ghobadifard, Sajjad Mohebbi*

Department of Chemistry, Faculty of Science, University of Kurdistan, Sanandaj, Iran

* *E-mail: sajadmohebi@yahoo.com*

Environmental pollution has become the main concern to humans [1,2]. In the point of view of numerous and permanent solar energy, photocatalysis has attracted much attention worldwide in environmental improvement and energy generation in the last years [3-5]. Herein, the synthesis of cobalt(II,III) oxide QDs-Ag_2MoO_4 heterojunction was reported by hydrothermal method and identified by different techniqs such as FT-IR, XRD, FE-SEM, EDS, TEM, DRS, PL, and UV–Vis spectroscopy. The SEM images illustrate that silver molybdate particles and cobalt(II,III) oxide QDs-AMO have a morphology of 3D-hexagons and nanosheets collected on the surface of 3D-hexagons with an average size of 36 and 28 nm, respectively. The cobalt(II,III) oxide QDs-silver molybdate photocatalyst was used toward the decolorization of MB with a conversion rate of 91%, which is 15 times faster than pure AMO. The higher photocatalyst activity of cobalt(II,III) oxide QDs-AMO should be attributed to its lower charge recombination rate in compared with pure silver molybdate . The stability of this photocatalyst was determind by reusing of it for five times without a remarkable decline in its activity. In addition, a postulated mechanism by the hydroxyl radical way was suggested.

Keywords: Conversion of Dyes, Heterojunction Photocatalyst, Semiconductor Quantum Dots

References

[1] Y. Liu, M. Cheng, Z. Liu, G. Zeng, H. Zhong, M. Chen, C. Zhou, W. Xiong, B. Shao, B. Song, *Chemosphere*, **2019**, 236, 124387.

[2] S. Garcia-Segura, E. Brillas, *J. Photochem. Photobiol. C-Photochem. Rev.*, **2017**, 31, 1–35.

[3] Y. Pi, X. Li, Q. Xia, J. Wu, Y. Li, J. Xiao, Z. Li, *Chem. Eng. J.*, **2018**, 337, 351–371.

[4] Z.Y. Lin, L.H. Li, L.L. Yu, W.J. Li, G.W. Yang, *PCCP*, **2017**, 19, 8356–8362.

[5] Z. Liu, B. Shao, G. Zeng, M. Chen, Z. Li, Y. Liu, Y. Jiang, H. Zhong, Y. Liu, M. Yan, *Chemosphere*, **2018**, 210, 922–930.