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

Innovative p–n semiconductor heterojunction as a nanophotocatalyst toward the C(OH)–H bond activation

Mahdieh Ghobadifard, Sajjad Mohebbi*

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

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

Nowadays, using semiconductors for photocatalytic treetment of pollutants has been broadly scrutinized due to their eco-friendly and low cost [1-3]. Nano magnetic heterostructure was prepared by solvent-free thermal procedure and was characterized by variouse techniques. The pure copper bismuth oxide and a semi-hard ferrite (cobalt ferrite) illustrated poor photoactivity because of their high charge recombination rate and slight visible light absorbance, respectively. The average size of synthesized heterojunction was approximately 20 nm, which displayed almost twofold higher photoactivity than pure $CoFe_2O_4$ and $CuBi_2O_4$ toward the C(OH)–H bond activation. This nanocomposite exhibits photocatalytic efficiency as high as 98% with very high stability. The enhanced photoactivity could be attributed to the efficient Z-scheme mechanism of charge carrier separation between p–n semiconductors, which decrease the electron–hole recombination rate. The results supply a promising approach to the preparation of p–n heterostructured photocatalysts for organic reactions.

Keywords: Semiconductors, Z-scheme, Cobalt Ferrite, Copper Bismuth Oxide, C(OH)–H Bond Activation

References

[1] S. Ding, D. Mao, S. Yang, F. Wang, L. Meng, M. Han, H. He, C. Sun, B. Xu, Appl. Catal. Environ. **2017**, 210, 386.
[2] D. Zhu, Q. Zhou, Environ. Nanotechnol. Monit. Manag., **2019**, 12, 100255.
[3] X. Pang, N. Skillen, N. Gunaratne, D. W. Rooney, P. K. J. Robertson, J. Hazard. Mater., **2021**, 402, 123461.