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

Preparation, identification and investigation of catalytic activity of sandwich polyoxometalates nanohybrids with graphene oxide

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Polyoxometalates have been considered a class of metal cluster complexes consisting of oxide anions of intermediate metals due to their high potential in chemistry.[1] In this study, in the first stage, graphene oxide (GO), amine graphene oxide (GO/NH_2) as well as Keggin-type sandwich polyoxometalates with abbreviation (POM) were synthesized and then synthesized polyoxometalates on amine graphene oxide (GO/NH_2-POM) is fixed.[2] The synthesized GO/NH_2-POM catalyst was characterized via Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), scanning electron microscopy (SEM), X-ray energy diffraction spectroscopy (EDAX), BET, and Thermal gravimetric analysis (TGA). The results of these analyzes showed that the stabilization of POM on graphene oxide was successfully performed. Methylene blue dye was used to evaluate the adsorption and degradation activity of the final synthesized catalyst. The results showed that maximum dye removal and degradation occur when using 10 mg catalyst, 20 ppm initial concentration of methylene blue at pH 9. Finally, according to the obtained results, it can be said that GO/NH_2-POM catalyst can have a good function as an effective adsorbent for removing methylene blue dye molecules from the effluent.

Keywords: Polyoxometate, Graphene oxide, Absorption process, Dye removal, Methylene blue, H_2O_2

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