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Dye decomposition by organo-inorganic catalytic nanocomposite material based on polyaniline (PANI) with Preyssler polyoxometalate

Parastou Gharaei,[a] Roushan khoshnavazi,[a] and Masoumeh Khatamian[b]

[a]*Department of chemistry, Faculty of Science, University of Kurdistan, Sanandaj, Iran*

[b]*Department of chemistry, Faculty of Science, University of Tabriz, Tabriz, Iran*

[*]*E-mail: gharaei.parastou@gmail.com*

Organic dyes are important industrial materials and are used in different industries. The extensive use of organic dyes and the indiscriminate disposal of dye-contaminated effluents can cause serious contamination of surface and groundwater[1]. The dyes are toxic and pose a threat to human health, as they can cause mutagenesis, chromosomal fractures, carcinogenesis, and respiratory toxicity[2,3]. Hence, many methods have been proposed to remove dyes from water and wastewater These methods are mainly based on sorption and membrane segregation. But the mentioned methods have disadvantages like high cost and time-consuming [4]. The aim of this study is dye decomposition by organo-inorganic catalytic nanocomposite. For this purpose, an organo-inorganic catalytic nanocomposite material based on conjugated polymer, polyaniline (PANI) with Preyssler polyoxometalate was developed by performing in situ chemical oxidative polymerization of aniline with ammonium persulfate (APS) oxidant synthesized. Then The structural and morphological properties of organo-inorganic PANI nanocomposites were analyzed by X-ray diffraction (XRD), field emission scanning electron microscopy (FE-SEM) and Fourier transform infrared spectroscopy (FT-IR), respectively. After that, the catalytic activities of the nanocomposites were evaluated by the catalytic degradation of Methylene Blue (MB) in different conditions.

Keywords: Organo-inorganic hybrid, Nanocomposite, Polyaniline, Polyoxometalates, Preyssler

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