

عنوان مقاله:

Ni_{0.5}Zn_{0.5}Cr₂O₄ Nanoparticles: Synthesis, Characterization, and Photocatalytic Degradation of Eosin-Y under Visible Light

محل انتشار:

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خلاصه مقاله:

Chromites as a family of normal type spinel structure have many applications in the fields ranging from applied physics and sciences to geophysics. Among the transition metal chromites with spinel-type structures, NiCr₂O₄ and ZnCr₂O₄ used as a catalyst, gas sensors, pigment, magnetic material and semiconductor [1]. The most widely used method for the synthesis of Ni_{0.5}Zn_{0.5}Cr₂O₄ (NZC) nanoparticles involves hydrothermal, coprecipitation and sol-gel combustion. Eosin Y (EY) is a stable dye and has been used as a catalyst for photocatalytic degradation of some compounds. Wastewater containing EY causes environmental problems due to its stability and dark color. EY, was potentially hazardous to human health [2]. The typical preparation of NZC nanoparticles, 1.1g of NiCl₂·6H₂O and 0.3g of Zn(CH₃COO)₂·2H₂O were dissolved in 10 ml of distilled water then the above solution added to 2.6g of CrCl₃·6H₂O that was dissolved in distilled water. NaOH was added to solution and the pH was raised above 10. The obtained mixture was then heated at 110 °C for 3h in the oil bath and the resulting powder was calcined at 600 °C for 4 hours. Detailed characterization of the as-prepared nanoparticles was carried out by FT-IR, X-ray diffraction and EDX. EDX analysis have shown among the samples for synthetic method and X-ray analysis contains the main assignments which identify the formation of NZC. Furthermore, the photocatalytic activity of NZC nanoparticles was confirmed by degradation of anionic dye Eosin-Y under visible light irradiation. The obtained NZC nanoparticles exhibit about 30% of degradation of dye.

کلمات کلیدی:

Ni_{0.5}Zn_{0.5}Cr₂O₄ (NZC), Coprecipitation method

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