عنوان مقاله:

MnCo2O4/MIL-53(Fe) nanocomposite catalyst: Fabrication and its application for the effective sonodegradation of organic dyes from water media

محل انتشار:

ششمین کنفرانس بین المللی فناوری های نوآورانه در زمینه علوم، مهندسی و تکنولوژی (سال: 1399)

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خلاصه مقاله:

In this work, for the first time, MnCo2O4/MIL-53(Fe) metal organic framework as a magnetically separable nanocomposite catalyst was successfully fabricated through the ultrasonic-assisted solvothermal method. FESEM, EDAX, FTIR, XRD, and VSM analyses were used to identify the as-fabricated nanocomposite. The sonocatalytic performance of MnCo2O4/MIL-53(Fe) was then carried out in the degradation of organic dyes, namelymethylene blue (MB), rhodamine B (RhB) and methyl orange (MO) organic dyes from water media. Several analytical factors, including irradiation time, initial dye concentration, process type, catalyst dosage, H2O2 concentration, and organic dye type were studied to achieve themaximum sonocatalytic efficiency. According to the gained results, the MnCo2O4/MIL- 53(Fe) sonocatalyst was incredibly able to degrade the organic dyes by the ultrasonic (US)/H2O2 system. As well, abundant •OH free radicals as the main reactive species during the sonodegradation process was detected, which may be responsible for the high sonodegradation rate on MnCo2O4/MIL-53(Fe) under US irradiation. In addition, the degradation efficiency decreased less than 6% after 4 sequential cycles. All experimental outcomes revealed that the sonocatalytic degradation of organic dyes by the MnCo2O4/MIL- 53(Fe) nanocomposite catalyst was an advisable choice for removing the toxic organic sewages.

کلمات کلیدی:

MnCo2O4/MIL-53(Fe), metal organic framework, nanocomposite, catalyst, organic dyes, sonodegradation