

عنوان مقاله:

Synthesis of TiO<sub>2</sub>/CD and TiO<sub>2</sub>/Ag/CD Nanocomposites and Investigation of Their Visible Light Photocatalytic Activities in the Degradation of Methylene Blue

محل انتشار:

نشریه متدهای شیمیایی، دوره 8، شماره 3 (سال: 1403)

تعداد صفحات اصل مقاله: 23

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خلاصه مقاله:

The surface of bio-synthesized TiO<sub>2</sub> nanoparticles was modified with a silane agent to generate the chemical link to the preparation of TiO<sub>2</sub>/β-cyclodextrin and TiO<sub>2</sub>/Ag/β-cyclodextrin nanocomposites. The structure of synthesized nanocomposites was identified using different techniques, including FTIR, DRS, XRD, ICP, TGA, FESEM, and EDX MAPPING. The photocatalytic activity of the nanocomposites was investigated in the degradation of methylene blue dye in aqueous solution under sunlight irradiation (400–700 nm). The effective factors in the degradation of methylene blue dye including, nanocomposite dosage, initial methylene blue concentration, and irradiation time were studied. The results revealed that under optimum degradation conditions (0.01 g nanocomposite, initial methylene blue concentration of 10 ppm, and 120 min sunlight exposure time), TiO<sub>2</sub>/Ag/β-cyclodextrin exhibited the highest photocatalytic activity among the tested nanocomposites. The photocatalytic efficiency of nanocomposites showed the order: TiO<sub>2</sub>/Ag/β-cyclodextrin (99.38%) > TiO<sub>2</sub>/β-cyclodextrin (84.1%) > TiO<sub>2</sub> nanoparticles (63.76 %). Photocatalytic activity of the synthesized nanocomposites revealed that these materials could be promising candidates for the degradation of various pollutants.

کلمات کلیدی:

β-cyclodextrin, TiO<sub>2</sub> nanocomposites, photocatalyst, Methylene blue, Visible light

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