

The Effect of Additives on Characterization and Photocatalytic Activity of Ag-TiO₂ Nanocomposite Prepared via Sol-Gel Process

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Abstract : Ag-TiO₂ nanocomposites were prepared by the sol-gel method with and without additives such as carboxy methyl cellulose (CMC), polyethylene glycol (PEG), polyvinyl pyrrolidone (PVP), and hydroxyl propyl cellulose (HPC). The characteristics of the prepared Ag-TiO₂ nanocomposites were identified by Fourier Transform Infra-Red spectroscopy (FTIR), X-Ray Diffraction (XRD), and scanning electron microscopy (SEM) methods. The additives have a significant effect on the particle size distribution and photocatalytic activity of Ag-TiO₂ nanocomposites. SEM images have shown that the particle size distribution of Ag-TiO₂ nanocomposite in the presence of HPC was the best in comparison to the other samples. The photocatalytic activity of the synthesized nanocomposites was investigated for decolorization of methyl orange (MO) in water under UV-irradiation in a batch reactor, and the results showed that the photocatalytic activity of the nanocomposites had been increased by CMC, PEG, PVP, and HPC, respectively.

Keywords : sol-gel method, Ag-TiO₂, decolorization, photocatalyst, nanocomposite

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