

Agarose-based TiO₂ – A novel photocatalyst for recyclable wastewater treatment

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TiO₂/agarose photocatalyst was prepared via simple heating method by dispersing TiO₂ nanoparticles in a three-dimensional structure of agarose matrix. Characterization of hybrid was carried out with Fourier transform infrared spectroscopy (FT-IR), thermogravimetric analysis (TGA), and scanning electron microscopy (SEM). The result of photocatalytic experiments indicated that the initial concentration of ingredient impacted significantly on photodegradation activity. The degradation efficiency of dyes can be increased by increasing the TiO₂ load as well as reducing the concentration of agarose. Especially, our gel exhibited a great recyclability which maintained high activity up to eight cycles. In particular, our hybrid photocatalyst could be easily reconstructed with desired architecture and be separated to recover pure TiO₂ that is attributed to thermo-reversible feature of agarose matrix. All of the results confirmed that the agarose-based TiO₂ photocatalyst can be a cost-effective and promising material for waste treatment application.

Keywords: Agarose; Titanium dioxide; Photocatalysis; Wastewater treatment