

Novel synthesis of TiO₂ combined spherical carbon for the photocatalytic decolorization of commercial Texbrite dyes under visible light response

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ABSTRACT

In this work, TiO₂-combined spherical carbon photocatalysts were prepared by using activated carbon and soot as starting material, phenolic resin (PR) as a binder, and TiO₂, TIP as a titanium source. A series of spherical samples (ATP, STP, AOP, SOP) were prepared by controlling the weight percentage of TiO₂ and the binder materials. These spherical samples were characterized via BET, XRD, TEM, AFM, and pressure drop. The photocatalytic activities of the spherical samples (ATP, STP, AOP, SOP) were investigated through the degradation of industrial dyes, including Texbrite BAC-L (TBAC), Reactive black b (RBB), Texbrite MST-L (TMST), and Texbrite BBU-L (TBBU), under irradiation with visible light. Meanwhile, the COD removal effect and the bactericidal effect test were also assessed. The kinetic studies and degradation rate were also conducted in order to determine the order of RBB > TBAC > TMST > TBBU for the industrial dyes.

Keywords: Spherical carbon; TiO₂; Industrial dye; Photocatalytic activities; COD; Bactericidal effect

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