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(57) Abstract :

ABSTRACT REAL TEXTILE WASTEWATER TREATMENT METHOD FOR TOXIC DYE DEGRADATION BY USING Tb/ TiO₂ NANOPARTICLES STUDY THEREOF The invention relates to an efficient and eco-friendly method for treating real textile wastewater using terbium-doped titanium dioxide (Tb/TiO₂) nanoparticles as a visible-light-active photocatalyst. Tb/TiO₂ nanoparticles (1–3 wt% Tb) synthesized via a co-precipitation method degrade complex dyes and organic pollutants into harmless products under sunlight or artificial light. The process operates at ambient conditions without external oxidants, achieving over 90% color removal and significant COD/BOD reduction. The catalyst exhibits excellent reusability, maintaining 85–90% efficiency after four cycles. This innovation provides a cost-effective, sustainable, and scalable solution for industrial wastewater purification and environmental remediation applications.

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