

Titanium Dioxide-Mediated Photocatalytic Degradation of Acridine Orange in Aqueous Suspensions under UV Irradiation

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摘要

Abstract

The TiO₂/UV photocatalytic degradation of Acridine Orange (AO) was investigated in aqueous heterogeneous suspension. The results indicated that photocatalytic reactions were enhanced in alkaline medium. While the rate of photocatalytic degradation of the dye increased with increasing concentration of TiO₂, at high doses of TiO₂, the rate of reaction was reduced as a result of light attenuation. To obtain a better understanding of the mechanistic details of this TiO₂ assisted dye photodegradation, the intermediates of the processes were separated, identified, and characterized using HPLC—ESI-MS. It was found that N-de-methylation degradation of the dye took place in a stepwise manner to yield mono-, di-, tri-, and tetra-N-de-methylated species. The probable photodegradation pathways are proposed and discussed.