Photocatalytic degradation of tert-butyl alcohol and tert-butyl formate using palladium-doped zinc oxide nanoparticles with UV irradiation

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ABSTRACT

Methyl tert-butyl ether (MTBE) is a well-known environmental pollutant. Its removal from water bodies is a challenge associated with ensuring the chemical is present only within the prescribed limits. Tert-butyl alcohol (TBA) and tert-butyl formate (TBF) are the two main intermediate (stable and toxic) compounds that are obtained during the decomposition of MTBE. The accumulation of these intermediates in water bodies raises serious issues about their chemical toxicity, as they are suspected carcinogens in humans. In this work, palladium-doped zinc oxide is utilised as a photocatalyst to decompose these contaminants in the presence of UV light. These photocatalysts have been found to efficiently degrade 100 ppm aqueous solutions of TBA and TBF using 100 mg of each of these photocatalysts and UV irradiation over a period of five hours.

Keywords: Methyl tert-butyl ether; Tert-butyl alcohol; Tert-butyl formate, Photocatalyst; Photocatalyst; Photodegradation; Zinc oxide

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