

*Article*

## Mo and Mn Co-doping for Isoproturon Degradation Under Visible Light

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**Abstract.** This research focused on the improvement of the catalytic efficiency of titanium dioxide using transition metals for isoproturon degradation under visible light. Molybdenum and manganese were varied at 0.5% by weight and 1% by weight. Mo/Mn doped TiO<sub>2</sub> was synthesized using sol-gel method and compared with the undoped TiO<sub>2</sub> to find out the most suitable doping metal and doping amount for the degradation of isoproturon, a pesticide generally used in agricultural sites. The characterization techniques for all doped TiO<sub>2</sub> included N<sub>2</sub> physical adsorption/desorption (BET), X-Ray diffraction Spectroscopy (XRD), Ultra Violet -Visible Spectroscopy (UV-VIS), Photoluminescence Spectroscopy (PL), and SEM (Scanning Electron Microscope) –EDX (Energy Dispersive X-ray Diffraction). For each TiO<sub>2</sub> catalyst, the photocatalytic degradation of 10 ppm isoproturon was carried out under visible light and the catalytic efficiency was determined using UV-VIS to measure the residual concentration of isoproturon. According to the results, doping molybdenum and manganese assists in reducing the band gap energy, increasing the surface area of catalysts, and enhancing the photocatalytic activity. In case of manganese, it also minimizes the recombination of photogenerated electrons and holes, which leads to better photocatalytic performance. The optimum isoproturon degradation is appeared with the co-doped Mo and Mn at 1% by weight.

**Keywords:** Photocatalytic degradation, sol-gel technique, isoproturon, molybdenum, manganese.

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