

Visible Photocatalytic Activities of Platinized WO_3 : The Generation and Role of OH Radicals

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This study aims to understand the visible light photocatalytic activities of platinized WO_3 (Pt/WO_3) on the degradation of aquatic pollutants and the role of main photooxidants. The presence of Pt on WO_3 is known to facilitate the multi-electron reduction of O_2 , which enables O_2 to serve as an electron acceptor despite the insufficient reduction potential of the conduction band electrons (in WO_3) for the one-electron reduction of O_2 . The concurrent oxidative reactions occurring on WO_3 was markedly enhanced in the presence of Pt and accompanied the production of OH radicals under visible light, which was confirmed by both a fluorescence method (using a chemical trap) and a spin trap method. The generation of OH radicals mainly comes from the reductive decomposition of H_2O_2 that is produced in situ from the reduction of O_2 on Pt/WO_3 . The rate of in-situ production of H_2O_2 under visible light was significantly faster with Pt/WO_3 than WO_3 .