# Study on the Photocatalytic Reduction of Nitrate in Aqueous Solution by TiO2-Based Photocatalysts


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**ABSTRACT**

The objectives of this work are to prepare TiO2-based photocatalysts using the photodeposition method, and to evaluate the effectiveness of photoreduction of nitrate in water using modified photocatalysts. Ag and Cu were doped on and mounted on the substrate (Al2O3). The physical-chemical characteristics of the prepared photocatalysts were analyzed by ICP-AES, BET, SEM/EDX, and XRD. The experimental results showed that the specific surface area for the various photocatalysts is about 112~170 m2/g and the major crystalline type of TiO2 is anatase. As for the photocatalytic reduction of nitrate, the Langmuir-Hinshelwood kinetic model of can well describes the experimental results. The modified photocatlyst has a better effectiveness of photocatalytic reduction of nitrate, especially for the Cu-doped catalysts with a conversion of 99%. The optimum experimental condition are found to be pH3, 0.1g/L of photocatalyst loading, and using formic acid (HOOH) of the scavenger. Result also show that the nitrate convert to intermediates such as NO2-; NH3-N and urea, the production of NH3-N and urea were affected by the formation rate of nitrite. This study confirmed that the energy-saving photocatalysts (BaF2/TiO2/Al2O3) can utilize the visible radiation and reduce nitrate, with the nitrate conversion of 10%.



Keywords : Photocatalytic Reduction ; Photocatalysts ; Al2O3 ; Nitrate ; Urea ; Kinetic model of reaction


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