

Removal of High Concentrated NH₃ on the Dielectric Barrier Discharge (DBD) Plasma-Photocatalytic Hybrid System with V-TiO₂

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In this study, we have focused on the Advance Oxidation Process (AOP) of NH₃ a species of odoured inorganic compounds in a plasma-photocatalytic hybrid system and investigated the mechanism for the AOP of NH₃. In order to the optimum condition for the oxidation of NH₃ with plasma system was carried out reaction at the applied voltage of 5, 7 and 10 kV. Also, the reaction mechanism and catalytic cycle for the AOP of NH₃ has been elucidated by in situ FT-IR studies under steady-state conditions. It is found that the optimum condition was at the applied voltage of 10kV and the catalytic activity was better than that loaded vanadium amount of 5mol%. In the plasma only system, the activity of the NH₃ oxidation was similar to that in the photocatalytic system. On the other hand, the plasma-photocatalytic hybrid system proved to the conversion of 100% just 30minutes after reaction. Consequently, the plasma-photocatalytic hybrid system could be provided the better effect for NH₃ decomposition compared with only photo or plasma systems.