

The effect of dissolved oxygen on the 1,4-dioxane degradation with TiO_2 and Au- TiO_2 photocatalysts

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Noble metals, e.g. Au nanoparticles, have been expected to assist an efficient charge separation of photogenerated electron-hole pairs leading to promoting the photocatalytic activity of TiO_2 . On the other hand, dissolved oxygen (DO) in an aqueous solution can also play a role as an electron acceptor to prevent the recombination of photogenerated charge carriers. In this study, we investigated the combined system of Au nanoparticles incorporated with TiO_2 and DO to gain insight into the relationship between them using a photocatalytic degradation of 1,4-dioxane. Specifically, three different TiO_2 photocatalysts that have different amount of Au nanoparticles were applied in photocatalytic reaction in the aqueous phase with different DO level. The rate constants of 1,4-dioxane photodegradation indicated the DO dependency is disproportional to the Au loading amount, implying that there is an overlapping function in capturing electrons between Au nanoparticles and DO.

The details of the experiment and results will be discussed in the presentation.