IMPROVED EFFICIENCY OF NITROGEN PHOTOREDUCATION OF TITANIUM DOPED FERRIC HYDROXIDE VIA THE POSSIBLE SEPARATION OF ACTIVE SITES FOR HYDROGEN AND OXYGEN EVOLUTION

S. Punchihewa*, O.A. Ileperuma**, and T.S. Lewke Bandara***
*Institute of Fundamental Studies, Hantana Road, Kandy.
**Dept. of Chemistry, University of Peradeniya &
Institute of Fundamental Studies, Hantana, Kandy.
***Dept. of Chemistry. Univesity of Peradeniya.

The photoactivity of the ferric oxide colloidal system decreases with time owing to the changes in the position of flat band potentials brought about by nitrate ions. The nitrate formed presumably arises via the oxidation of ammonia by the oxygen evolved via the photosplitting of water. When titanium doped ferric hydroxide colloids was irradiated under nitrogen, enhanced yields of ammonia were obtained compared to ferric oxide alone. However, no measurable amount of nitrates were obtained in these experiments. We have also noticed the formation of trace amounts of hydrazine after 2h of irradiation. These observations can be explained as due to the separation of the reactive centres in the photosplitting of water where hydrogen evolution takes place on the ferric oxide particles while oxygen is evolved at a titanium centre. Thus the photo oxidation of NH_3 is prevented and the catalytic activity is enhanced.

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