Photocatalytic Hydrogen Production from water-methanol mixtures using N-doped $NaTaO_3$ under visible light irradiation ($\lambda \leq 420nm$)

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The photocatalytic water reduction is potentially the most efficient and powerful way for utilizing solar energy to produce hydrogen. However, photocatalysts that fucntion in the visible light region ($400nm \leq \lambda \leq 800nm$) must be developed for the practical use of solar energy. Currently researchers are making efforts to develop the visible-driven photocatalyst by modification of the band structure of UV-driven photocatalysts. Thus, the doping of nitrogen into UV active photocatalysts has been reported by many research groups. By our research group, N-doped $Sr_2Nb_2O_7$ as visible-driven photocatalyst for hydrogen production was reported. In this research, we report photocatalytic water reduction using nitrogen-doped $NaTaO_3$ under visible light irradiation ($\lambda \leq 420nm$). $NiO/NaTaO_3$ was reported by Kudo group to be the most efficient photocatalyst for overall water splitting under UV light irradiation. Similarly in case of N-doped $Sr_2Nb_2O_7$, Nitrogen doping in $NaTaO_3$ red-shifted the light absorption edge into the visible light range and induced visible light photocatalytic activity.