Visible light-activated photocatalyst by oxygen release

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In this study, $Ti(SO_4)_2$ solution was mixed with NH_3 solution to make visible-light activated photocatalyst, in which oxygen deficient sites would be formed due to the oxidation reaction of adsorbed N-compounds with the oxygen in the lattice during the heat treatment. Oxygen deficient sites were known to play a major role for photocatalyst to absorb visible light to bluish-green 500nm, while the sites also act as a recombination center.

Yellowish powder was ground with an agate mortar and characterized by UV/Vis spectroscopy, SEM, XRD and TEM. Absorbance in the range of below 550 nm clearly increased. Particles have a size of ca. 30nm and round shaped. XRD results showed that anatase phase peaked at $2\theta = 25.3$ were created. Meanwhile, photocatalytic activity of the obtained photocatalyst was compared with commercialized P25 (Degussa) using isopropyl alcohol (IPA) as a probe compound. To be more reasonable and applicable, experiments on activity were performed either varying light sources or reactor systems.