

Wanlapa Chitchiaranai 2011: Preparation, Characterization and Photocatalytic Application of Nitrogen and Sulfur co-doped TiO<sub>2</sub> Photocatalyst. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Apisit Songsasen, Ph.D. 132 pages.

N-S co-doped TiO<sub>2</sub> photocatalyst was prepared by the sol-gel method, which studied in term of effect on type of titania precursors and solvent in the step of preparation. The titania precursors used are titanium(IV) tetraisopropoxide and titanium(IV) tetra-n-butoxide. The solvents which were studied in this work are methanol, ethanol and isopropanol. The crystallite size and phase composition of the prepared photocatalyst were characterized by TGA, Raman and XRD. The XRD and Raman results indicated that the anatase transform to the rutile phase when increase temperature. The co-doped elements were incorporated into the TiO<sub>2</sub> structure due to the expansion of crystal lattice. SEM/EDX and TEM results showed that nitrogen and sulfur were dispersed in TiO<sub>2</sub> structure and its surface morphology was spherical like fluffy powders. Elemental Analysis and UV-Vis/DR results also suggested that nitrogen and sulfur could be dormant in the TiO<sub>2</sub> lattice and had effect on the narrowing of the band gap in the structure. These improved properties that could enhanced the photocatalytic activity of N-S co-doped TiO<sub>2</sub> under visible light. For the photocatalytic activity, N-S co-doped TiO<sub>2</sub> by titanium(IV) tetraisopropoxide used isopropanol as a solvent calcined at 400°C succeeded in degrading benz[a]anthracene and methylene blue with the highest efficiency.

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