

Thesis Title	Effects of Palladium on Photocatalytic Activity of Zinc Oxide Nanoparticles Synthesized by Flame Spray Pyrolysis
Author	Mr. Chawarat Siriwong
Degree	Master of Science (Material Science)
Thesis Advisor	Assoc. Prof. Dr. Sukon Phanichphant

ABSTRACT

Flame Spray Pyrolysis (FSP) was employed to synthesize the pure ZnO and palladium (Pd)-doped ZnO nanoparticles containing 0.25, 0.50, 0.75 and 1.0 mol% Pd. Pd is one of the most versatile and most widely applied as catalytic metal. Precursor solutions of zinc naphthenate and palladium (II) acetylacetonate were sprayed and combusted, resulting in nanostructured particles. The crystalline phases, morphology and size of the nanoparticles were characterized by X-ray diffraction (XRD), transmission electron microscopy (TEM) and the specific surface area analysis using BET indicated that ZnO nanoparticles had the hexagonal phase and had hexagonal, rod-like and spheroidal morphologies. The sizes of these nanoparticles were found to be in the range of 5-20 nm. The Pd dispersion was determined by mapping mode of scanning transmission electron microscopy (STEM). Photocatalytic activity of ZnO samples were investigated by UV-induced degradation of methanol and sucrose in aqueous solution in photocatalytic reactor. The results showed that the photocatalytic activity of all Pd-doped ZnO nanoparticles were better than that of pure ZnO nanoparticles. The best result of photocatalytic activity for the degradation of both methanol and sucrose was obtained from 0.50 mol% Pd-doped ZnO nanoparticles.