

Spectroscopic Analysis of of Noble Metals doped TiO₂ and ZnO

Nanoparticles: Comparison of Catalytic Activities

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TiO₂ and ZnO nanoparticles (NPs) doped with noble metals (NM = Au, Pd, or Pt) were synthesized by applying a thermosynthetic method, and the catalytic activities of the tested samples were compared. After characterizing their surface spectroscopic analysis, we evaluated the catalytic effects of the samples the oxidation of 4-aminothiophenol (4-ATP) by using high-resolution photoemission spectroscopy (HRPES) and on the oxidation of 4-ATP in aqueous solution by taking electrochemistry measurements. As a result, we found a good positive correlation between the numbers of defect structures induced by the doped noble metals and the catalytic activity, and showed that Pd-TiO₂ and Pt-ZnO NPs can act as efficient catalysts due to their relatively large number of defect structures.