

Effect of Addition of Surfactant to the Surface Hydrophilicity and Photocatalytic Activity of Immobilized Nano TiO₂ Thin Films

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Abstract : This research studied the effect of adding surfactant to the titanium dioxide (TiO₂) sol-gel solution that was used to immobilize TiO₂ on glass substrates by dip coating technique using TiO₂ sol-gel solution mixed with different types of surfactants. After dipping into the TiO₂ sol, the films were calcined and produced pure anatase crystal phase. The thickness of the thin film was varied by repeating the dip and calcine cycle. The prepared films were characterized using FE-SEM, TG-DTA, and XRD, and its photocatalytic performances were tested on degradation of an organic dye, methylene blue. Aside from its photocatalytic performance, the photo-induced hydrophilicity of thin TiO₂ films surface was also studied. Characterization results showed that the addition of surfactant gave rise to characteristic patterns on the surface of the TiO₂ thin film which also affects the photocatalytic activity. The addition of CTAB to the TiO₂ dipping solution had a negative effect because the calcination temperature was not high enough to burn all the surfactants off. As for the surface wettability, the addition of surfactant also affected the induced surface hydrophilicity of the TiO₂ films when irradiated under UV light.

Keywords : photocatalysis, surface hydrophilicity, TiO₂ thin films, surfactant

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