

Photocatalytic study of organosilane-modified zinc oxide nanoparticles

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Abstract. In our recent studies, we have investigated the tunability of optical properties of zinc oxide nanoparticles (ZnO NPs) through surface modification with organosilane surfactants. In the present paper, the effect of ZnO NPs modified with variable amount of 3-(trimethoxysilyl)propylmethacrylate (MPS) surfactant was investigated toward the photocatalytic degradation of methylene blue (MB), using two different UV light sources emitting at 254 nm and 365 nm. While the maximum photodegradation efficiency of 63% was reached by ZnO NPs loaded with the highest concentration of MPS upon exposure at 254 nm, in the case of UV exposure at 365 nm an opposite photodegradation trend was observed. Actually, a significant photodegradation efficiency of 95% was recorded by the unmodified ZnO, followed by ZnO NPs modified with 2% MPS for which the photodegradation efficiency amounted to 80%, thus highlighting their best photocatalytic performance.

Keywords: zinc oxide nanoparticles, photocatalysis, photodegradation efficiency, methylene blue.

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