

Abstract Submitted
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Interfacial charge separation and trapping in composite photocatalysts¹ DINKO CHAKAROV, Chalmers Univ of Tech — We explore the phenomena of interfacial charge separation and trapping in composite metal-semiconductor systems and the interaction (energy and charge exchange) between optically excited nanoparticles and the surrounding medium. Disc-shaped copper nanoparticles (Cu NPs) were fabricated by hole-mask colloidal lithography on bare and thin titania film covered fused silica substrates. The dynamics of Cu oxide formation around the NPs were studied in water by localized surface plasmon resonance (LSPR) spectroscopy. We found that the oxidation rate is strongly enhanced under UV irradiation when the NPs are on the surface of the titania film, in comparison to NPs deposited on an inert fused silica substrate. The reason is sought in the ability of TiO₂ to create hydroxyl radicals with strong oxidative potential in water under UV irradiation and the charge transfer at the interface between the Cu NPs and the TiO₂. The results demonstrate the potential of using LSPR spectroscopy to monitor the oxidation of Cu NPs in situ and in different environments.

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