

Designing nanostructured coating of TiO₂ particles for control of active oxygen release under ultraviolet irradiation

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Coatings with a unique nanostructure was applied to the surfaces of titanium oxide (TiO₂) particles, and the reaction of active oxygen inside the nano channels was traced using methyleneblue (MB) dye molecules as a probe under UV irradiation. Titanium oxide particles were covered with mesoporous silica (MPS) and 6-O-palmitoyl-L-ascorbic acid (PAA, an active oxygen scavenger) molecules were retained inside the nano channels of MPS. Under UV irradiation active oxygen were generated by TiO₂ and the consumption of MB reflects the competitive reaction with PAA and MB. In this study we could intentionally retain the hydrophobic organic molecules in the nanostructured coatings and succeeded in detecting the reaction of active oxygen by using a small organic molecules as a reaction probe.