

Photocatalytic TiO₂ and doped TiO₂ coatings on stainless steel for antibacterial property

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Photocatalysts have an excellent activity for removal of microorganisms in water under light source. Titanium dioxide (TiO₂) is considered to be one of the most promising photocatalysts owing to its favorable band gap energy (3.2 eV in anatase phase), high photochemical stability, non-toxic property, and relatively inexpensive cost. In this study, TiO₂ and doped TiO₂ sols were synthesized and coated on 304 stainless steel by dip-coating method under various conditions. The morphology and composition of photocatalyst on the substrate were investigated by field emission scanning electron microscope (FE-SEM). Photocatalytic activities of the prepared samples were analyzed through methylene blue (MB) discoloration by decomposition. Anti-bacterial activities against *Escherichia coli* (*E. coli*) were evaluated for the prepared samples on Kirby-Bauer antibiotic test method. As-prepared samples were washed with sterilized H₂O several times and their activities were evaluated for the confirmation of the stability of the attached catalysts at each washing step.