

Study on VOC removal test of glass fibers attached by TiO₂ or V-TiO₂ through cross-linking method

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Titanium dioxide (TiO₂), used for self-cleaning material, has been studied as a commercial product that can be applied to the air cleaning as well as water treatment since TiO₂ having a photocatalytic activity can decompose organic compounds. In this study, commercial TiO₂ (P25) and vanadium doped TiO₂ (V-TiO₂) synthesized by sol-gel method were applied to glass fiber as substrate. The P25 or synthesized V-TiO₂ attached to glass fiber through chemical bonding by electrostatic interaction between carboxylic groups of cross-linking agent and photocatalyst particle. The surface morphology of the attached photocatalysts was characterized using field emission scanning electron microscopy. Zeta potential, an indicator of the stability of nanoparticles in suspensions, was analyzed to find the optimum concentration of particle suspension. Decomposition activities of as-prepared samples were evaluated through VOC concentration degradation test, which was performed under UV light sources in a flow chamber system. Photocatalytic activities of P25 or V-TiO₂ attached glass fibers were compared with each other.