

Degradation of gas-phase toluene by TiO₂ loaded on carbon fibers using Atomic Layer Deposition (ALD) under UV irradiation

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TiO₂ thin films were prepared on C fibers, and photocatalytic activity of these films for removing gas-phase toluene was studied. TiO₂ films were deposited on C fiber with 0.5 Å-per-cycle growth rate by Atomic Layer Deposition (ALD) using TTIP (titanium tetra-isopropoxide) and H₂O as precursors. The catalysts were characterized by Brunauer-Emmett-Teller (BET) for surface area and Scanning Electron Microscope (SEM) for morphology, respectively. Moreover, the samples were further characterized by X-ray Photoelectron Spectroscopy (XPS). As a function of TiO₂ thickness, no significant change in the photocatalytic activity could be identified. Interestingly, the bare-carbon fiber showed an even higher photocatalytic activity than the TiO₂ thin films for removing toluene. Origin of the high photocatalytic activity of the bare C fiber is discussed.