

Photocatalytic activities and surface properties of e-beam treated carbon paper deposited TiO₂ using Atomic Layer Deposition (ALD)

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Thin film of TiO₂ deposited on carbon paper was fabricated by atomic layer deposition (ALD) using titanium isopropoxide (TTIP) and H₂O as precursors. In this work, the photocatalytic activities of TiO₂ films with and without e-beam treatment were compared. The samples were treated by e-beam using e-beam energy of 1MeV and exposure range between 5 and 15kGy. The photocatalytic activity was evaluated by the photocatalytic degradation of methyleneblue (MB) under UV irradiation (365nm) at room temperature using an UV-vis spectroscopy. The surface properties were characterized by scanning electron microscope (SEM) and X-ray photoelectron spectroscopy (XPS). The sample treated by the low radiation dose has more catalytic activity than other ones. SEM images show that the high radiation dose caused the TiO₂ to aggregation on carbon paper. Due to the aggregation of TiO₂, the partially exposed carbon paper was oxidized.