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Composite TiO2-Carbon nano films with enhanced photocatalytic activity[1] DINKO CHAKAROV, RAJA SELLAPPAN, Chalmers University of Technology — Composite TiO2-carbon thin films prepared by physical vapor deposition techniques on fused silica substrates show enhanced photocatalytic activity, as compared to pure TiO2 films of similar thickness, towards decomposition of methanol to CO2 and water. Raman and XRD measurements confirm that annealed TiO2 films exhibit anatase structure while the carbon layer becomes graphitic. Characteristic for the composite films is an enhanced optical absorption in the visible range. The presence of the carbon film causes a shift of the TiO2 absorption edge and modifies its grain size to be smaller. The observed enhancement is attributed to synergy effects at the carbon-TiO2 interface, resulting in smaller crystallite size and anisotropic charge carrier transport, which in turn reduces their recombination probability.

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