On the mechanism of enhanced photocatalytic activity of composite TiO2/carbon nanofilms

DINKO CHAKAROV, RAJA SELLAPPAN, Department of Applied Physics, Chalmers University of Technology — We fabricated and analyzed well-defined model samples consisting of anatase and graphitic carbon films with and without modifying the interface between them by a thin SiO2 space layer. The study was performed in the search for the origin of the enhanced photocatalytic activity of composite TiO2–carbon systems observed previously by us, but also reported in number of publications. We found that the films with a TiO2/C interface show noticeably lower photoluminescence intensity and shorter carrier life times compared to single TiO2 films with the same thickness and composition. The stronger non-radiative recombination was mainly assigned to charge carrier leakage (transfer) at the interface between TiO2 nanocrystallites and the carbon film.

1The study is performed with financial support from N-INNER, project Solar Hydrogen (P30938-1).