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Electronic properties of adjoined TiO2 nanocrystals[1] O. DIWALD, M.J. ELSER, N. SIEDL, Vienna University of Technology, Institute of Materials Chemistry, J. BERNARDI, Vienna University of Technology, USTEM — The discussion of particle attachment effects is indispensable for deeper insights into electronic conduction across grain boundaries and thus essential to photovoltaics. We investigated the condensation of isolated TiO_2-nanocrystals [1] induced via the application of a simple hydration-dehydration cycle. The resulting particle network shows a mesoporous structure as well as significant changes in the optical absorption properties as investigated by UV-diffuse reflectance spectroscopy. In addition, polarizable conduction band electrons are only observed in the network which consists of adjoined TiO_2-nanocrystals [2]. Since photo-assisted tunneling between localized states in the oxide particle network represents an important conduction mechanism in dye-sensitised solar cells, UV induced charge separation processes were studied on nanocrystal aggregates using EPR and IR spectroscopy. Corresponding results will be discussed in the light of associated structural data. [1] Berger et al. Chem. Phys. Chem. 2005 6 2104-2112 [2] Elser et al. J. Phys. Chem. B 2006, 110, 7605

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