The possibility of ballistic electron transport in dye-sensitized semiconductor nanocrystalline particle aggregates

K Tennakone, I R M Kottegoda, L A A De Silva and V P S Perera

Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka

Received 15 February 1999, in final form 25 June 1999, accepted for publication 17 August 1999

Abstract. A dye-sensitized photoelectrochemical cell made from a nano-porous composite film consisting of tin(IV) and zinc oxides generates exceptionally high photocurrents at an optimum mixing ratio of the two oxides. It is suggested that this phenomenon originates from ballistic transport of electrons injected by the excited dye molecules along the interconnected chains of tin(IV) oxide nanocrystallites to a zinc oxide crystallite.