The suppression of the recombination of photogenerated carriers in a dye-sensitized nano-porous solid-state photovoltaic cell

K Tennakone, G R R A Kumara and K G U Wijayantha

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

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Abstract. The p–n junction p-CuI/nano-porous n-TiO_2 made by coating CuI on a nano-porous film of n-TiO_2 does not show a photocurrent action spectrum corresponding to the bandgap excitation of TiO_2. However, if the surface is lightly coated with the dye cyanidin the peak corresponding to bandgap excitation of TiO_2 is clearly manifested in addition to the sensitization peak. The effect is explained as originating from the relay action of the dye molecules adsorbed at the surface of TiO_2 mediating hole transfer from the valence band of TiO_2 to the valence band of p-CuI.