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The effect of MgO on the enhancement of the efficiency in solid-state dye sensitized photocells fabricated with SnO2 CuI

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Solid-state dye sensitized photo cells were fabricated with nanocrystalline SnO2 covered with a thin layer of (3-4 nm) MgO as the anode and the hole conductor, CuI as the cathode. The effect of the thin layer was investigated in detail by means of SEM, TEM, X-RD, conductivity and capacitance measurements together with photospectral responses. While the cell fabricated with n-SnO2/Ruthenium bipyridyl dye/CuI delivered almost no photocurrent with very low photovoltage, the cell n-SnO2 (MgO)/Ruthenium bipyridyl dye/CuI delivered a short circuit current ~ 2.5 mA cm-2 with an open circuit voltage of ~ 500 mV. Enhancement in the photocurrent and the voltages was found when the percentage of MgO was around 4 % and it is explained as the formation of a thin energy barrier, which suppresses the recombination of photoelectrons.