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LETTER TO THE EDITOR

$1/f$ noise and dye-sensitized solar cells

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Abstract

The adsorbed molecular species, such as H_2O and I_2, that produce electron acceptor states on the TiO_2 surface are found to generate $1/f$ noise in the electric current through nanocrystalline films of TiO_2. It is suggested that the trapping and detrapping of electrons at the surface states is the cause of this noise. When the TiO_2 film surface is coated with dyes, the passivation of the active surface sites suppresses $1/f$ noise. Implications of $1/f$ noise on the functioning of the dye-sensitized solar cell, notably the effect of adsorbed iodine in inducing recombinations, are discussed.