

On the effects of doping on diffusion and recombination of photocarriers in dye-sensitized nanocrystalline TiO₂ solar cells

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We are developing a simple electrochemical method for doping nanocrystalline anatase TiO₂ electrodes. The effects of doping on the photocarrier transport and recombination properties of dye-sensitized cells are explored by time-resolved photocurrent and photovoltage measurements. It is shown that dopants have a dramatic influence on both the electron diffusion times and the recombination lifetimes. The dependence of the photocarrier diffusion coefficient on photoinduced charge density is examined for various doping densities. The results are discussed within the framework of current models on electron transport and recombination in dye-sensitized solar cells.