

SIMULATING THE EFFECT OF INHOMOGENEITY
OF THE THICKNESS OF NANOCRYSTALLINE
TiO₂ LAYERS ON THE DIFFUSION OF CHARGE
CARRIERS IN SOLAR CELLS BASED
ON A DISPERSION HETEROJUNCTION
WITH DYE

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S u m m a r y

We study the diffusion transport in a nanocrystalline TiO₂ layer of a solar cell with dye for various values of the dispersion of the thickness of a TiO₂ layer. A model of the transport, which considers the influence of the dispersion of the thickness of a TiO₂ layer on the total response of the electrolyte/TiO₂/FTO system under pulse laser irradiation, is developed. In the model, the motion of charge carriers through such a TiO₂ layer is described as a motion through the system of parallel TiO₂ links with various lengths. In the presence of the dispersion of the thickness of a TiO₂ layer described by the Gauss function, the coefficient of diffusion of charge carriers increases and the position of the diffusion peak shifts to shorter times as compared with the dispersionless case. We calculated the dispersion of the coefficient of diffusion for specimens with a distribution over thicknesses measured with a profilometer.