

Influence of Film Thickness on Adsorption of Dye Molecules in Dye-Sensitized Solar Cells

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DSSCs are composed of sensitizing dye, nanoporous metal oxide film, electrolyte and counter electrode. In general, the metal oxide films plays key role in the improvement of power conversion efficiency, The control of the film structure is very important for application of TiO₂ films in DSSCs [1,2]. In this work, we measured the adsorption amount of N719 directly in specially designed small adsorption chamber. The adsorption kinetics data of dye molecule was analyzed by pseudo-first-order and pseudo-second order models and also the diffusion coefficient of electrolyte by electrochemical analysis. The conversion efficiency of DSSC with different TiO₂ film thickness was also evaluated based on the properties of light transmittance, electrochemical impedance spectra, and photovoltaic conversion efficiency.