

Mass Transport Analysis of N719 and Electrolytes on Mesoporous TiO₂ Thin Films for Dye-Sensitized Solar Cells

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In order to improve the conversion efficiency of dye-sensitized solar cells (DSSCs), it is very important to optimize their mesoporous TiO₂ electrode [1,2]. Accordingly, we prepared the photo-electrode using a commercial Dyesol paste deposited on F-doped SnO₂ (FTO) glass substrates by screen printing method with different thickness (5, 9 and 14 μm). Mass transport of N719 dye and electrolytes on the prepared photo-electrode was systematically investigated employing adsorption kinetic and electrochemical analysis (Fig. 1). Also, the prepared photo-electrodes were evaluated based on the properties of light transmittance, electrochemical impedance spectra, and photovoltaic conversion efficiency. The results showed that the conversion efficiency (geometrical area of 1 cm²) of DSSC with different TiO₂ film thickness was highly dependent on the mass transport of a dye molecule and a triiodide/iodide redox couple.