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Effect of dye absorption time on performance of ZnO, TiO_2 and SnO_2 nanoparticle photo-anodes in dye sensitized solar cell

A Arabkhorasani, E Saievar-Iranizad, and A Bayat

Department of Physics, Tarbiat Modares University, Tehran, Iran
E-mail: saievare@modares.ac.ir

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Abstract
Interior design, engineering, and the configuration of materials used in photo-anode systems play key roles in the photovoltaic performance of dye solar cells. In this study, the photo-anodes of dye sensitized solar cells were fabricated based on TiO_2, ZnO and SnO_2 nanoparticles separately using doctor Blade method on the transparent conductive oxide as substrates, then sensitized with N719 dye. Due to the fact that the dye plays the role of photon absorption, different photo-anode oxides were placed in a N719 dye solution over a different time period. Based on current-voltage curve, efficiency parameter, short-circuit current density, open circuit voltage, and fill factor of the cells were obtained. The results of current-voltage characterization indicate that the best time for the N719 dye loading for the TiO_2 and SnO_2 layers is 20 h and for the ZnO layer is 1 h.

Keywords: solar cell, titanium dioxide, zinc oxide, tin dioxide, sensitizing time

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