

Synthesis and Evaluation of Photovoltaic Properties of an Organic Dye for Dye-Sensitized Solar Cells

Authors : M. Hosseinnejad, K. Gharanjig

Abstract : In the present study, metal free organic dyes were prepared and used as photo-sensitizers in dye-sensitized solar cells. Double rhodanine was utilized as the fundamental electron acceptor group to which electron donor aldehyde with varying substituents was attached to produce new organic dye. This dye was first purified and then characterized by analytical techniques. Spectrophotometric evaluations of the prepared dye in solution and on a nano anatase TiO₂ substrate were carried out in order to assess possible changes in the status of the dyes in different environments. The results show that the dye form j-type aggregates on the nano TiO₂. Additionally, oxidation potential measurements were also carried out. Finally, dye sensitized solar cell based on synthesized dye was fabricated in order to determine the photovoltaic behavior and conversion efficiency of individual dye.

Keywords : conversion efficiency, dye-sensitized solar cell, photovoltaic behavior, sensitizer

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