عنوان مقاله:

Preparation of Dye-sensitized Solar Cells Based on New Organic Dye

محل انتشار:

بیستمین کنگره شیمی ایران (سال: 1397)

تعداد صفحات اصل مقاله: 1

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خلاصه مقاله:

Dye-sensitized solar cells (DSSCs) are current topic of research in the field of green chemistry and renewable energy resources. Organic dye molecules have considerable importance in comparison with inorganic dye molecules by their applicability to green chemistry in DSSCs [1]. Several types of organic dyes have been reported including near IR dyes for DSSCs applications [2]. In this work, new metal free dye based on Indigo is reported and its optical, electrochemical, photovoltaic properties and structural relationships are investigated in detail. The general procedure for preparing metal free organic dyes is given in Figure 1. The absorption spectrum of dye in THF has two distinct absorption bands at around 320 nm and 545.5 nm. The absorption peaks at around 545.5 nm can be assigned to an intramolecular charge transfer between the donor group and the cyanoacrylic acid [2], providing efficient charge-separation at the excited state. The λmax of dye adsorbed on a TiO2 film is 568 nm. Upon dye adsorption on to a TiO2 surface, the wavelength of maximum absorption is bathochromically shifted by 22.5 as compared to the corresponding spectra in solution, implying that dye adsorbed on to TiO2 surface contain partial J-type aggregates. The DSSCs were prepared and compared to investigate the relationships between the sensitizing behavior of dye molecule and its structures. The solar-energy-to-electricity conversion efficiency (η) of the DSSCs is 4.73 %.

کلمات کلیدی: