Chemical Data Collections 22 (2019) 100256

Contents lists available at ScienceDirect

Chemical Data Collections

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Data Article

Application of unsymmetrical bis-chalcone compounds in dye sensitized solar cell

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ARTICLE INFO

Article history:
Received 15 May 2019
Revised 8 July 2019
Accepted 9 July 2019
Available online 11 July 2019

Keywords:
Push pull effect
π-conjugated system
Unsymmetrical bis-chalcone
Dye sensitized solar cell (DSSC)
Conversion efficiency
Crystal structure

ABSTRACT

A total of nine unsymmetrical bis-chalcone compounds have been synthesized and spectroscopically characterized. The unsymmetrical bis-chaclone compounds were substituted with either methoxy (OMe) or chloro (Cl) as the electron donor, and either difluoroboryl (BF_2) or a ruthenium(II)-dimethylsulfoxide [Ru(II)-DMSO] complex as the electron acceptor. All these compounds were used as the dye sensitizer in dye sensitized solar cell (DSSC) by using fluorine doped tin oxide (FTO) glass coated with titanium(IV) oxide (TiO_2) as the working electrode, and the indium tin oxide (ITO) glass coated with platinum as the counter electrode. The conversion efficiency of fabricated DSSCs were tested and the unsymmetrical bis-chalcone compound with OMe and BF_2 substituents in the same molecule recorded the highest efficiency at 0.091%. In contrast, the unsymmetrical bis-chalcone with OMe and Ru(II)-DMSO complex has the lowest efficiency at 0.001%.

Specifications Table *[please fill in right-hand column of the table below].*

Subject area	*Organic and inorganic chemistry, and solar energy*
Compounds	*Unsymmetrical bis-chalcones*
Data category	*Spectroscopic spectral, elemental analysis, X-ray crystallography and solar cell conversion efficiency*
Data acquisition format	*NMR, IR, UV–vis spectra, X-ray crystallographic data, conversion efficiency and incident photon-to-current conversion efficiency*
Data type	*Analyzed and interpreted*
Procedure	*Nine unsymmetrical bis-chalcone compounds have been synthesized and analyzed. The compounds were used as the dye in DSSC and the conversion efficiencies were determined*
Data accessibility	*The data can be obtained from the present paper and supplementary information*

1. Rational

The dye molecule in a dye sensitized solar cell (DSSC) plays an important role in absorbing energy from visible light, transferring excited electrons to the conduction band of TiO_2 and also receiving electrons from the redox reaction in order to repeat the cycle [1,2]. In general, an ideal dye molecule possesses several properties which firstly, include excellent stability in the excited, ground and oxidized states. Secondly, strong absorption capacity in the visible range under radiance

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https://doi.org/10.1016/j.cdc.2019.100256
2405-8300/