

Publication

Alkyl chain-functionalized hole-transporting domains in zinc(II) dye-sensitized solar cells

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 2953396**Author(s)** Hostettler, Nik; Fürer, Sebastian; Bozic-Weber, Biljana; Constable, Edwin C.; Housecroft, Catherine E.**Author(s) at UniBasel** [Housecroft, Catherine](#) ; [Constable, Edwin Charles](#) ; [Bozic Weber, Biljana](#) ; [Hostettler, Niklaus](#) ; [Fürer, Sebastian](#) ;**Year** 2015**Title** Alkyl chain-functionalized hole-transporting domains in zinc(II) dye-sensitized solar cells**Journal** Dyes and Pigments**Volume** 116**Pages / Article-Number** 124-130

Keywords Zinc, Sensitizer, DSSC, Surface-functionalization, 'Surfaces-as-ligands', 2,2':6',2''-terpyridine FTO/TiO₂ electrodes have been functionalized with {Zn(tpyanchor)(tpyancillary)}²⁺ dyes (tpy = 2,2'':6'',2''-terpyridine) using a stepwise method to sequentially introduce (i) the anchoring ligand tpyanchor (either a dicarboxylic acid or a diphosphonic acid), (ii) Zn²⁺ ions, and (iii) chromophoric ancillary (4-([2,2'':6'',2''-terpyridin]-4''-yl)-N,N-bis(4-alkoxyphenyl)aniline ligands. A comparison of unmasked and fully masked DSSCs containing representative dyes shows a significant drop in photon-to-current efficiency upon masking. Solid-state absorption spectra of the dye-functionalized electrodes confirm that the intensity of absorption decreases with the steric demands of the ancillary ligand. DSSC measurements show that the {Zn(tpyanchor)(tpyancillary)}²⁺ dyes give poor photon-to-current efficiencies, values of the short circuit current density (JSC) and the external quantum efficiency (EQE) spectra are consistent with very poor electron injection. Introducing longer alkoxy chains in place of methoxy substituents in the hole-transporting domains in tpyancillary is beneficial, resulting in increased JSC and VOC, although values remain low despite the 'push-pull' design of the sensitizers.

Publisher Elsevier**ISSN/ISBN** 0143-7208**edoc-URL** <http://edoc.unibas.ch/dok/A6348560>**Full Text on edoc** Available;**Digital Object Identifier DOI** 10.1016/j.dyepig.2015.01.008**ISI-Number** 000350936400017**Document type (ISI)** Article