

Accepted Manuscript

Title: PTA-based ruthenium complexes as photosensitizers for dye-sensitized solar cells

Authors: Benjamin Sierra-Martin, Ana Maldonado-Valdivia, Manuel Serrano-Ruiz, Antonio Romerosa, Antonio Fernandez-Barbero



PII: S0927-7757(18)30480-1
DOI: <https://doi.org/10.1016/j.colsurfa.2018.06.003>
Reference: COLSUA 22572

To appear in: *Colloids and Surfaces A: Physicochem. Eng. Aspects*

Received date: 20-3-2018
Revised date: 1-6-2018
Accepted date: 2-6-2018

Please cite this article as: Sierra-Martin B, Maldonado-Valdivia A, Serrano-Ruiz M, Romerosa A, Fernandez-Barbero A, PTA-based ruthenium complexes as photosensitizers for dye-sensitized solar cells, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* (2018), <https://doi.org/10.1016/j.colsurfa.2018.06.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

PTA-based ruthenium complexes as photosensitizers for dye-sensitized solar cells

Benjamin Sierra-Martin^{a,*}, Ana Maldonado-Valdivia^a, Manuel Serrano-Ruiz^b, Antonio Romerosa^b and Antonio Fernandez-Barbero^{a,c}

^a NanoLab, Department of Chemistry and Physics, University of Almeria, 04120 Almeria, Spain; bsierra@ual.es, amaldonado@ual.es, afernand@ual.es

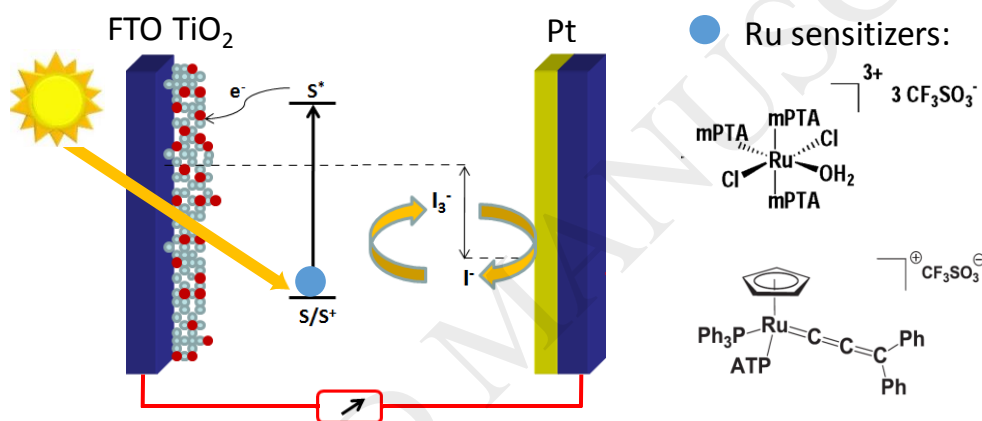
^b Inorganic Chemistry Lab-CIESOL, Department of Chemistry and Physics, University of Almeria, 04120 Almeria, Spain; mserrano@ual.es, romerosa@ual.es

^c Institute of Applied Chemical Sciences, Universidad Autonoma de Chile, Santiago, Chile.

* Correspondence: bsierra@ual.es; Tel.: +34-950015909

Received: date; Accepted: date; Published: date

Graphical Abstract



Abstract:

Two novel ruthenium complexes are synthesized, photo-characterized and tested as photosensitizers in dye-sensitized solar cells (DSCs): [RuCl₂(mPTA)₃(H₂O)](CF₃SO₃)₃ (**C1**) (m: methyl; PTA: 3,5,7-triaza-phosphaadamantane) and [Ru(C=C=CPh)₂Cp(PTA)(PPh₃)](CF₃SO₃) (**C2**). The complexes are soluble in organic solvents and, interestingly, in water, which makes them useful for water-based photochemical processes. They possess excellent photon-absorption over a wide range of the spectrum with intense peaks at ~ 330 nm for both sensitizers. A second peak is found for **C2** at 525 nm, wider than the corresponding to the N719 standard dye. DSCs using these sensitizers are evaluated against different electrolytes. The solar cell performance was similar for both complexes and strongly dependent on the electrolyte nature, with a maximum conversion efficiency of 0.32 % for the iodide/triiodide electrolyte.

Keywords: ruthenium complex, dye, sensitizer, solar cell, PTA.

1. Introduction

The use of dye-sensitized solar cells (DSCs) is a well established strategy for solar energy conversion because of their efficiency, inexpensive manufacturing and environmental friendly nature [1,2]. DSCs are sandwich-type electrochemical devices based on nanocrystalline metal

Download English Version:

<https://daneshyari.com/en/article/11012321>

Download Persian Version:

<https://daneshyari.com/article/11012321>

[Daneshyari.com](https://daneshyari.com)