ELECTRONIC SUPPLEMENTARY INFORMATION (ESI)

Amplification of Light Collection in Solid-State Dye-Sensitized Solar Cells via Antenna Effect through Supramolecular Assembly

Bilel Louahem M'Sabah,[1] Mourad Boucharef,[1,2] Julien Warnan,[3] Yann Pellegrin,[3] Errol Blart,[3] Bruno Lucas,[1] Fabrice Odobel,[3,*] J. Bouclé[1,*]

[1] XLIM UMR 7252, Université de Limoges/CNRS, 123 Avenue Albert Thomas, 87060 Limoges Cedex, France

[2] Université de Constantine 1, B.P. 325, Raoute Ain El Bey, Constantine 25017, Algérie

[3] UNAM, Université Nantes, Angers, UMR CNRS 6230, 2, rue de la Houssinière - BP 92208, 44322 Nantes Cedex 3, France

* Corresponding authors: johann.boucle@unilim.fr (+33587506762)
fabrice.odobel@univ-nantes.fr (+33251125429)

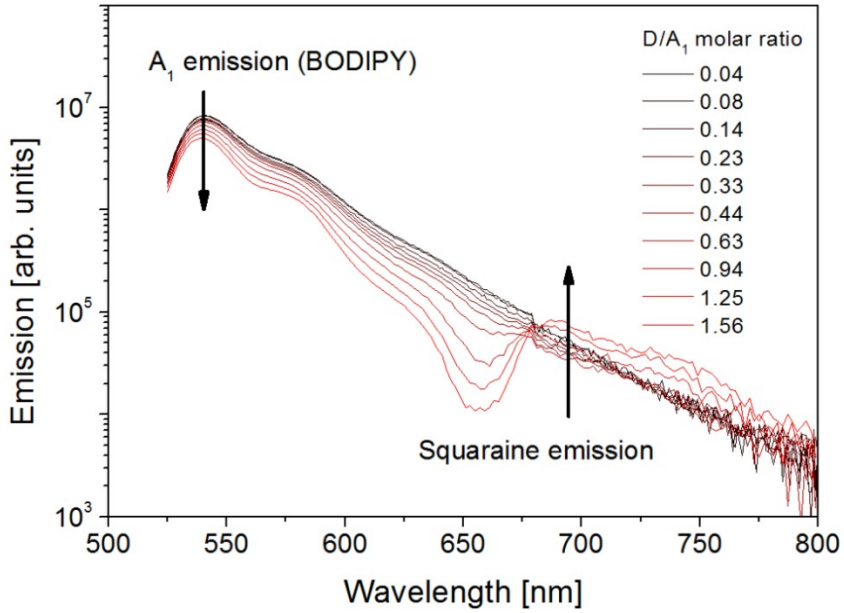

Figure S1. Photoluminescence spectra of a dyad D/Antenna A1 mixture as a function of the molar ratio. The solvent is a mixture of ethanol:dichloromethane. The excitation is at 520 nm (initial concentration of antenna A1 dyad D is 0.0125 mM).

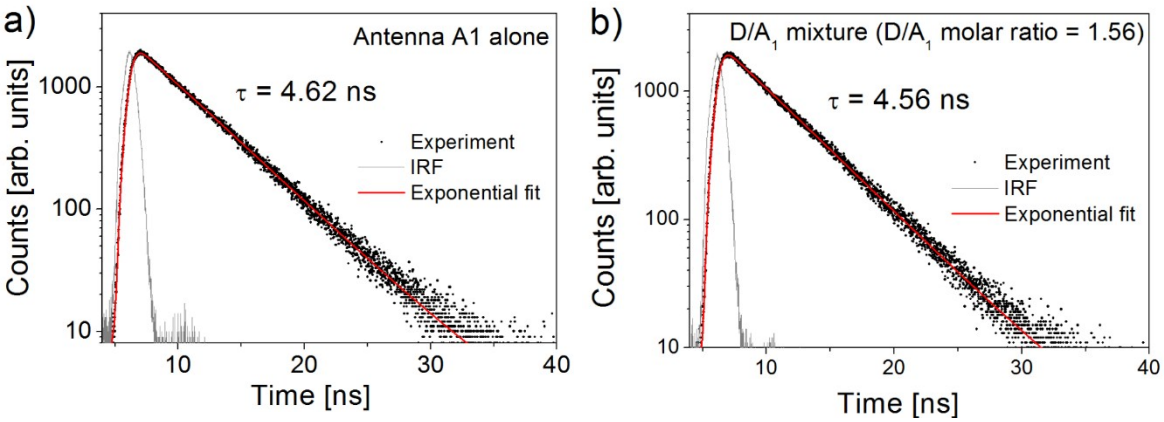

Figure S2. Photoluminescence decays of (a) antenna A_1 alone in solution (acetonitrile, 0.0125mM) and of (b) a mixture of dyad D and antenna A_1 (mixture ethanol:dichloromethane, 1:1 in volume) corresponding to a D/A_1 molar ratio of 1.56). The deconvolution of the experimental data by a mono-exponential function, taking into account the instrument response function (IRF), are also presented, as well as the corresponding decay time.

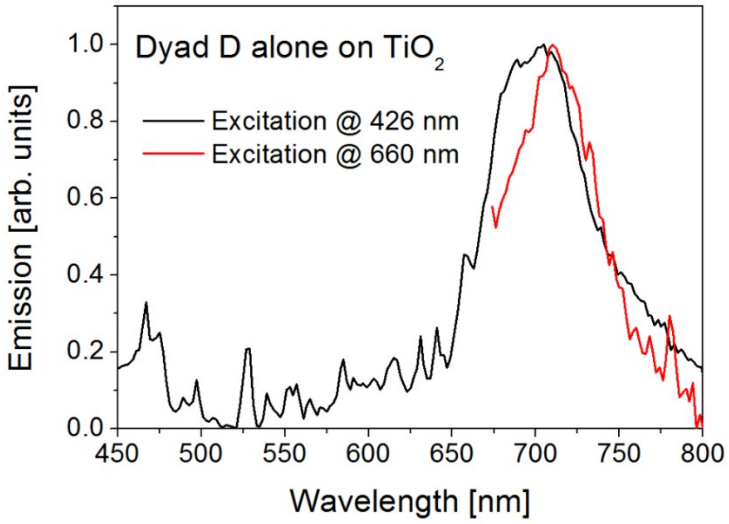

Figure S3. Photoluminescence spectra of dyad D alone on porous TiO_2 electrode (2 μm thick films) for an excitation at 426 and 660 nm. The signal to noise ratio is reduced due to the poor emission intensity of the squaraine unit centered at approximately 706 nm.

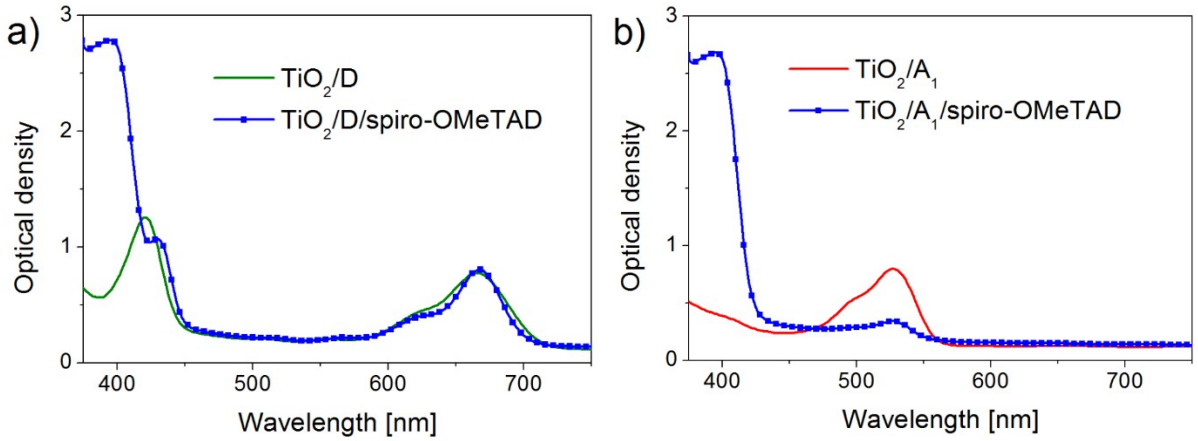

Figure S4. Optical absorption spectra of sensitized TiO_2 electrodes (2 μm thick) sensitized with (a) dyad D alone and (b) antenna A1 alone, before and after infiltration by the molecular HTM (spiro-OMeTAD), and used as porous electrodes for the ssDSSC devices. In both cases, a significant removal of chromophores following the HTM infiltration is evidenced, especially in the case of antenna A_1.