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NIR-sensitized Dye-Sensitized Solar Cells: effect of the different molecular moieties on the photovoltaic performances

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Dye-sensitized solar cells (DSSCs) are nowadays one of the most interesting alternatives when looking at solar harvesting technologies able to provide enhanced performance under low or weak irradiation and for building integrated applications (BIVP) [1]. However, most of these cells absorb only the visible domain of the light spectrum that is why these devices are not transparent or no less than semi-transparent. Far-red/near infra-red (NIR) light is indubitably interesting to widen solar harvesting. Of course, the photoconversion expected by the exploitation of these frequencies (700-1000 nm) is lower with respect to the visible region. But, NIR sensitizers allow to tune the colors of final devices from green to blue, even to transparent. Transparent cells without any coloration would allow the visible light to pass through unhampered reaching a fully integration of PV devices in BIPV [2]. Our group have already developed several squaraine dyes for DSSC absorbing in the NIR region [4,5]. A few series of new efficient organic sensitizers based on squaraine [6], cyanine and croconine core-units with a shifted absorption as high as 830 nm have been synthesized and fully characterized. DSSCs based on these new efficient sensitizers are able to convert up to 36% IPCE until 850 nm.

VG10 SQUARAINE for DSSCs [3]





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