

# Recent developments on dye-sensitized solar cells to pave the way for commercialization

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The electric power produced by photovoltaic panels is already very close to the electricity market price. Photovoltaics have the ability to produce electricity where it is consumed, using buildings as support. New technologies are emerging with the ability to merge into buildings' structure. Dye sensitized solar cells (DSC) belong to the so-called third generation of photovoltaic cells and are front positioned to lead the building-integrated photovoltaic (BIPV) market. DSCs are very aesthetic, with various patterns and colors, and show a unique ability to harvest efficiently the diffuse sunlight, making them suitable for façades.

Lab-size dye-sensitized solar cells reached very recently an impressive energy efficiency of 15 %. Taking into account that DSCs show real energy efficiencies *ca.* 40 % above multicrystalline silicon photovoltaics for modules with the same nominal power, the achieved energy efficiency make DSCs potentially more efficient than m-Si. Besides, since DSCs are screen-printed produced, DSC modules show different colors and patterns and a very high ability to merge into the construction materials of roofs, façades and windows, resulting into a hybrid building.

Humanity is at the edge of a new revolution where PV will take a major role and buildings will produce most of the energy of their needs. A problem remains unsolved, the winter and night electricity production. However, photoelectrochemical cells able to efficiently produce hydrogen from water splitting could be soon an answer, besides other emerging technologies.

A last question remains to be answered; what would be the role of Portuguese companies and Universities in this great endeavor?