Dye-sensitized Solar Cells

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A dye-sensitized solar cell (DSSC) is a low-cost device for converting solar energy and possesses a large-area, flexible, colorful and lightweight devices. It is based on a semiconductor (TiO₂) deposited on a layer of conductive ITO glass. The dye is placed over this semiconductor film, in contact with an electrolyte in order to close the circuit.

The crucial requirements for dye-sensitized solar cells are: (a) wide absorption spectrum; (b) the right anchor to the TiO₂, for instance -COOH; (c) match the energy of the LUMO level of the photosensitizer with the Fermi level of the semiconductor and (d) the photosensitizer should be photostable, electrochemically and thermally.

Based in these requirements, we chose the porphyrins as electron donors in the dye, because of their superior light-harvesting ability in the visible región, connected to the anchor group by a platinum complex.