

Anthocyanin-sensitized nanoporous TiO₂ photoelectrochemical solar cells prepared by a sol–gel process

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Abstract

Photoelectrochemical solar cells comprising a colloidal TiO₂ photoelectrode and sensitized with anthocyanin pigments, delphinidin purple and cyanidin 3,5-diglucose extracted from *Hibiscus sabdariffa* and *Ribes nigra* plants, respectively, have been fabricated. A sunlight-to-electricity conversion efficiency of 3.16% under simulated solar light was obtained with the cell sensitized with the delphinidin purple dye. Open-circuit photovoltages of 0.2–0.3 V and short-circuit photocurrents of 15–30 mA/cm² were obtained, which points to efficient charge-carrier injection at the semiconductor/electrolyte interface. The cells also showed a high activation energy of between 0.3–0.5 eV.