

TiO₂ nano-porous photoelectrochemical cells (PECs) sensitized with mixed cationic/anionic dye systems: Role of the second cationic fluorescent dye on the photocurrent enhancement

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Abstract

Bromopyrogallol red (BPR), an anionic dye material was used in nano-porous photoelectrochemical cells as the sensitizer in conjunction with a fluorescent cationic dye, rhodamineB (RhB) and acridine orange (AO). The overlap between absorption and emission spectra of BPR/RhB and the formation of a strong associated complex influences the photoelectron transfer rate to be enhanced and to produce enhanced photovoltaic properties. Fluorescence quenching studies indicate that photoexcited cationic dye materials deactivate efficiently by BPR following different mechanisms. FTIR and rR spectroscopic evidences suggest that the electrostatic interaction of fluorescent cationic dye takes place from the $-\text{SO}_3^-$ group of the BPR molecule.

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