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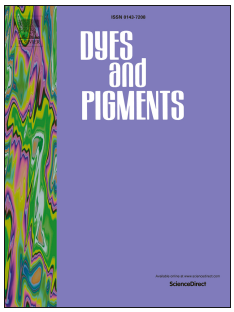

$(D-\pi-A)^3$-Type metal-free organic dye for dye-sensitized solar cells application

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Graphical abstract

Comparing to those of the dye **RD–SC** bearing a mono D–π–A branch, the dyes **PTZTC1–3** containing three independent D–π–A branches exhibit tripled molar extinction coefficient, higher IPCE values and broader IPCE spectra response in the visible region, as well as higher density of D–π–A light-harvesting units absorbed on the surface of TiO_2. Among the DSSCs sensitized by these dyes, the cell based on **PTZTC3** attained the best power conversion efficiency (PCE) due to the highest short-circuit current, open-circuit voltage and the longest electron lifetime of the device.