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# Enhancement of quantum efficiency by co-adsorbing small julolidine dye and bulky triphenylamine dye in dye-sensitized solar cells

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### Graphical abstract

Co-adsorption of bulky dye blocks the approach of  $I_3^-$  to the flat dye with wide absorption, reducing probability of the direct charge transfer from excited-state dye to  $I_3^-$ , and thus increasing electron injection yield.

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