

ELECTRONIC SUPPLEMENTARY INFORMATION

The influence of dye structure on charge recombination in dye-sensitized solar cells

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Estimation of the HOMO energy levels of Z-907 and Z-960 by cyclic voltammetry.

Figure S1 shows cyclic voltammograms for Z-960 or Z-907 adsorbed on FTO in a 0.1 M solution of tetrabutylammonium perchlorate (TBAP) in acetonitrile, measured at a scan rate of 2 V s^{-1} . The S^+/S formal potentials of the sensitizers, associated with the HOMO levels, have been estimated as the average of the forward and reverse peak potentials, yielding 0.23 V and 0.35 V vs. ferrocene internal standard for Z-960 and Z-907 respectively.

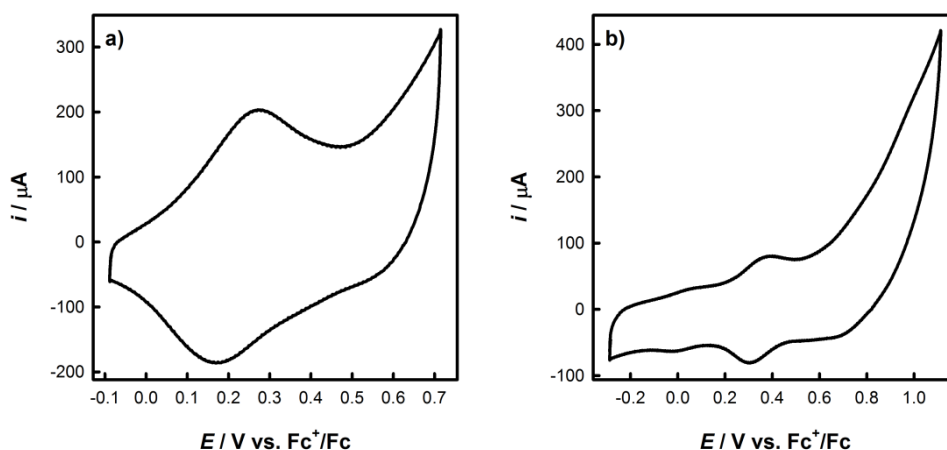


Figure S1. Cyclic voltammograms for Z-960 (a) or Z-907 (b) adsorbed on FTO in a 0.1 M solution of TBAP in acetonitrile, measured at a scan rate of 2 V s^{-1} .

Parameters obtained from fitting EIS spectra for DSCs with $16 \mu\text{m}$ thick TiO_2 layers.

Figure S2 shows the parameters obtained by fitting EIS spectra for DSCs employing the Z-907 and Z-960 sensitizers in conjunction with $16 \mu\text{m}$ thick TiO_2 layers. The errors in the fitted parameter values are expected to be large at low voltages for the Z-960 cell because the effective electron diffusion length is substantially shorter than the TiO_2 layer thickness. Nevertheless, the conclusion that charge recombination is many times faster in the Z-960 cell compared with the Z-907 cell can still be drawn.

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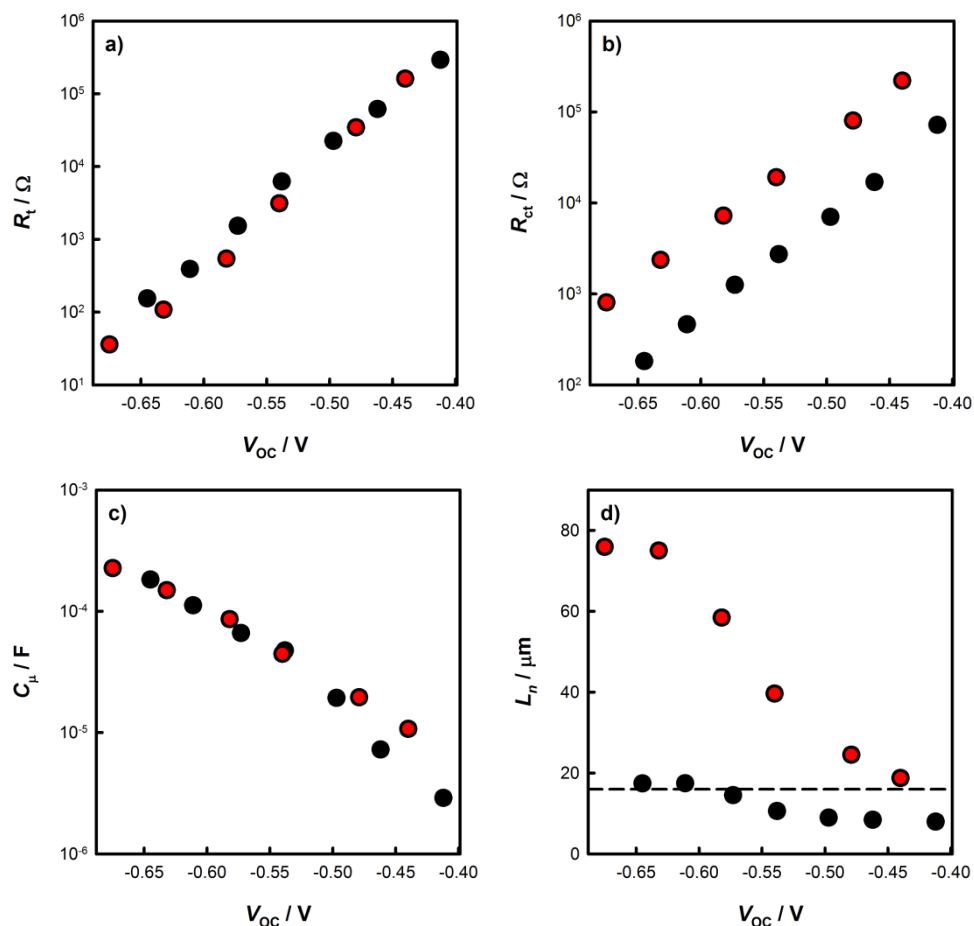


Figure S2. Dependence of charge transport resistance (R_t , a), charge transfer resistance (R_{ct} , b), chemical capacitance (C_{μ} , c) and electron diffusion length (L_n , d) on open-circuit photovoltage for DSCs employing Z-960 (black points) or Z-907 (red points) as sensitizer.