Supporting Information

Photon Management through Titania Architecture Engineering in Organic Dye-Cu Electrolyte Dye Sensitized Solar Cells

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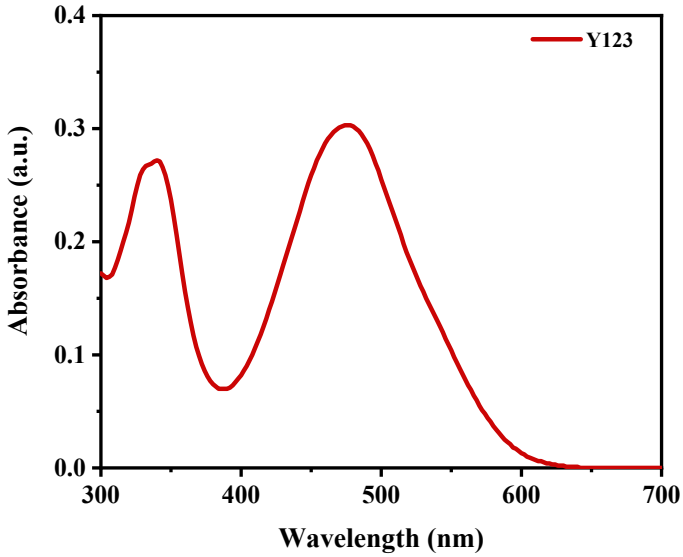


Fig. S1 UV-Vis absorption of Y123 dye.

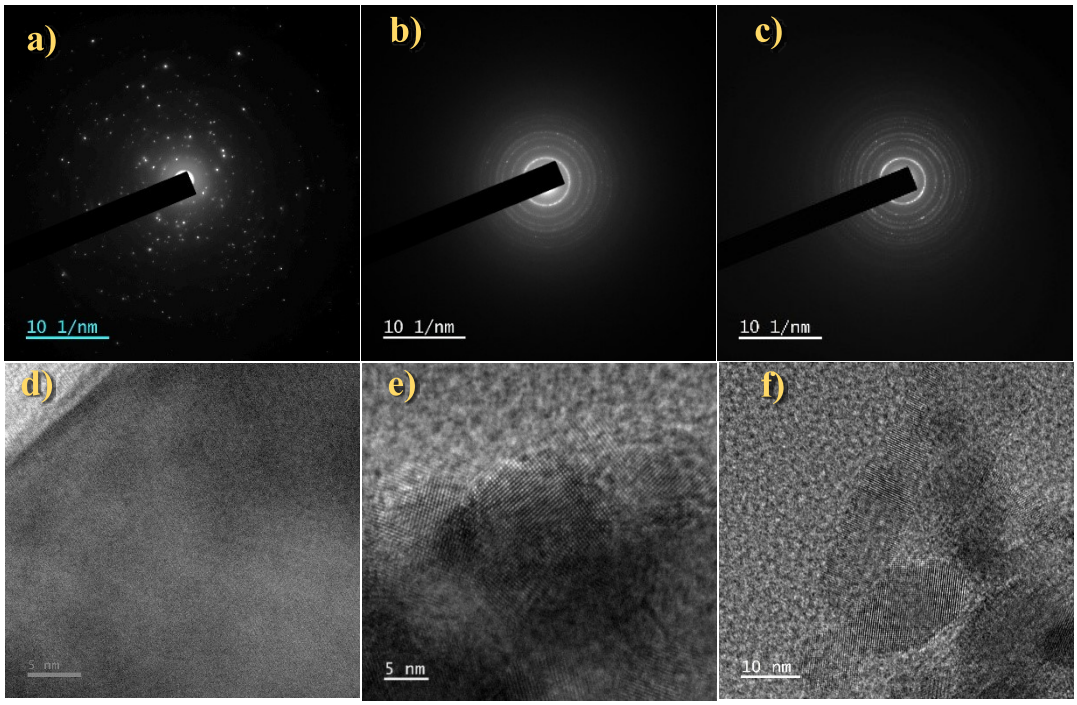


Fig. S2 SAED of a) TS, b) TF and c) TNF; HRTEM images of d) TS, e) TF and f) TNF.

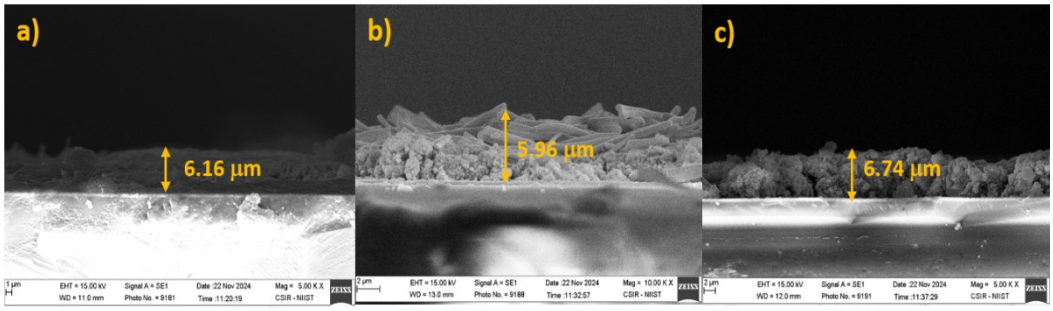


Fig. S3 Cross sectional SEM images of a) TS, b) TF and c) TNF.

Section S1

Dye adsorption study

The dye loading studies were carried out using a UV-Visible spectrometer (Shimadzu model 2100) as described below. A dye stock solution was prepared by dissolving 0.01 mM of the dye in a 1:1 mixture of acetonitrile and tert-butanol, and is divided into two equal portions solution 1 and solution 2. The photoanode films of interest is immersed in the dye solution 2 for 16 hours. After 16 hours, this dye solution was retrieved. The films were washed with 1 mL of acetonitrile to remove the weakly adsorbed dye and is also added to the retrieved dye solution 2. The same amount of acetonitrile is added to solution 1 to compensate for the variation in concentration. The UV-visible absorption spectra of both solutions 1 and 2 are recorded.

Finally, the amount of dye adsorbed per unit area (mol/cm^2) of the mesoporous layer is estimated as,

$$dye\ loading = \frac{(abs1 - abs2)\,V}{\varepsilon s l}$$

abs 1 and abs 2 are the absorbance maximum of solution 1 and 2 respectively, V is the volume of the solution, ε is the molar extinction coefficient of the dye, s is the photoanode's active area, and l is the path length of the incident light in the solution.

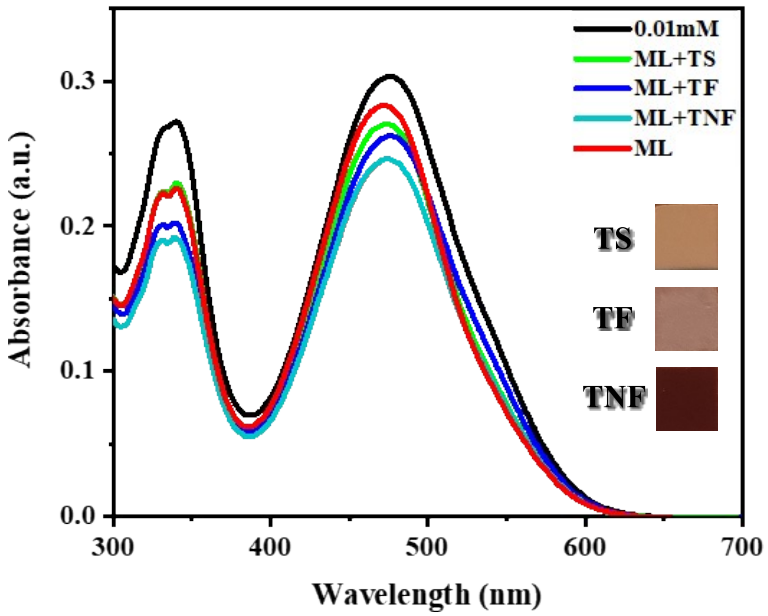
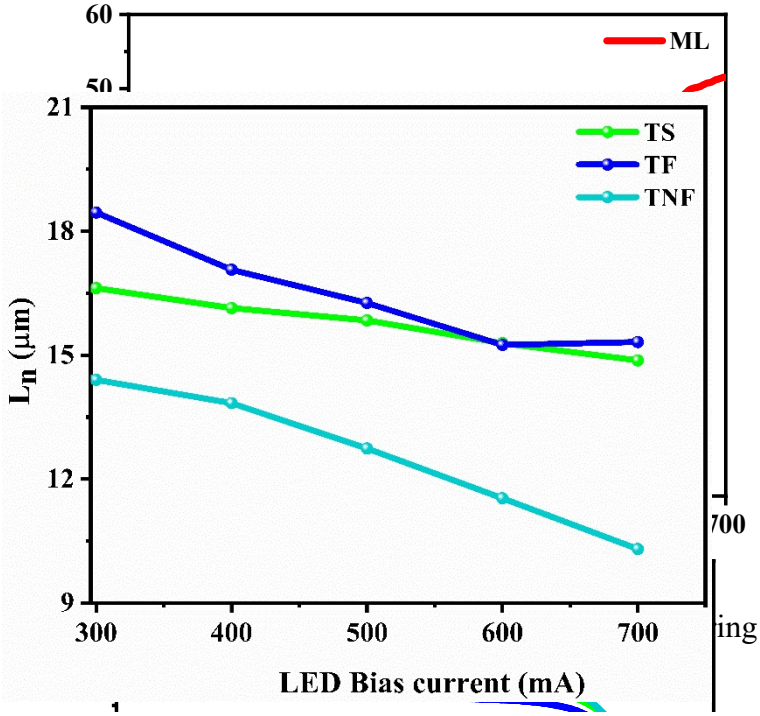


Fig. S4 Dye adsorption study- absorbance of dye solution after soaking corresponding films; inset shows the dye adsorbed films.

Sample	Efficiency (η) %	Dye loading (D) $mol.cm^{-2}$	η/D $\%.cm^2.mol^{-1}$
TS	5.26	3.49×10^{-9}	1.51×10^9
TF	4.59	5.86×10^{-9}	0.78×10^9
TNF	4.49	1.07×10^{-8}	0.42×10^9

Table S1. Photovoltaic efficiency (η), dye loading (D), and normalized efficiency (η/D) for TS, TF, and TNF electrodes under 1 sun (AM 1.5G).



ing layer.

Fig. S6 Diffusion length of devices with TS, TF, and TNF.

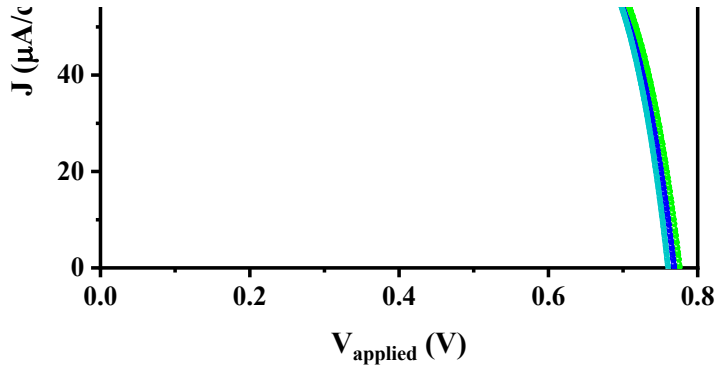


Fig. S7 Photocurrent -Voltage characteristics of devices under 1000 lux WWCFL condition.