

## Support information

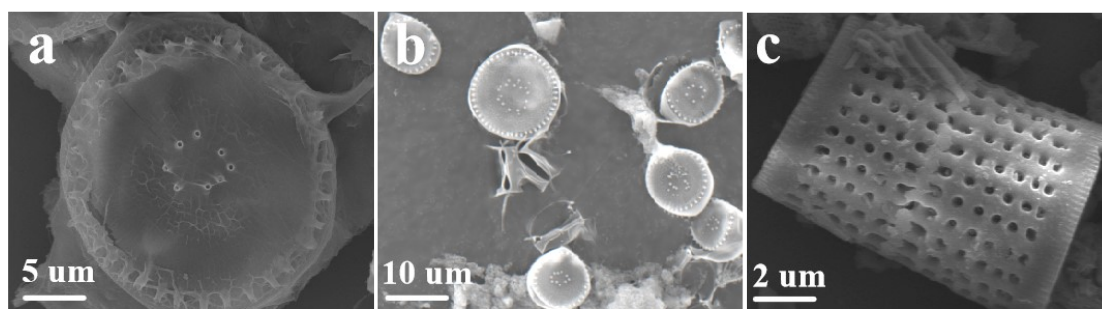
### Effective UV-protection and photovoltaic efficiency enhancement of $\text{Eu}^{3+}/\text{Tb}^{3+}$ -complex doped diatom shells for polymer solar cells

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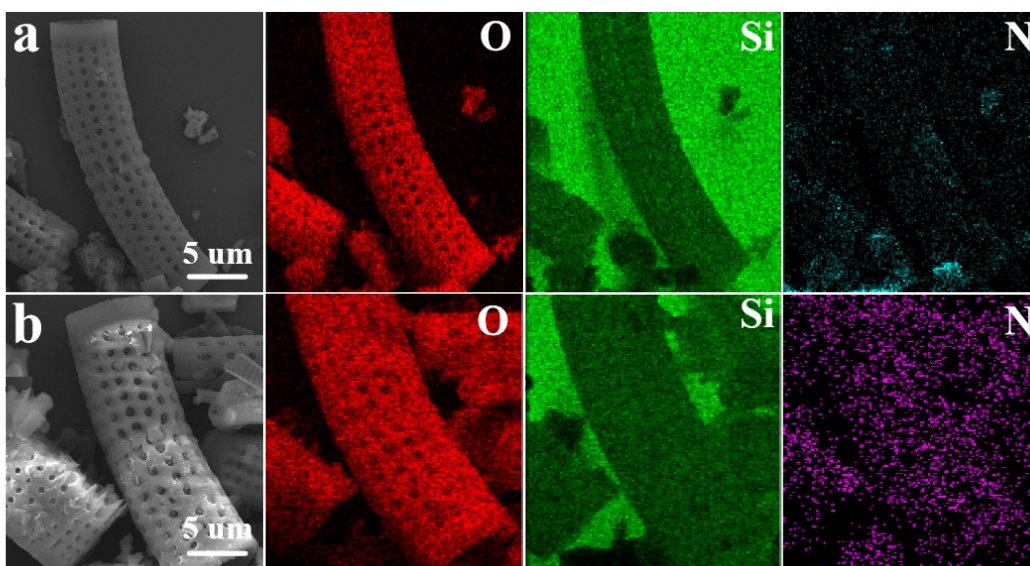
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**Figure S1** SEM images of the bottom of sea streptococcus *Streptomyces wilsoni* (a) and (b), SEM images of diatom shells (c).

LDT	Elemental content (wt%)							
	C	O	Si	N	P	Fe	Ca	Al
	56.64	26.17	23.60	12.48	0.17	0.1	0.19	0.35

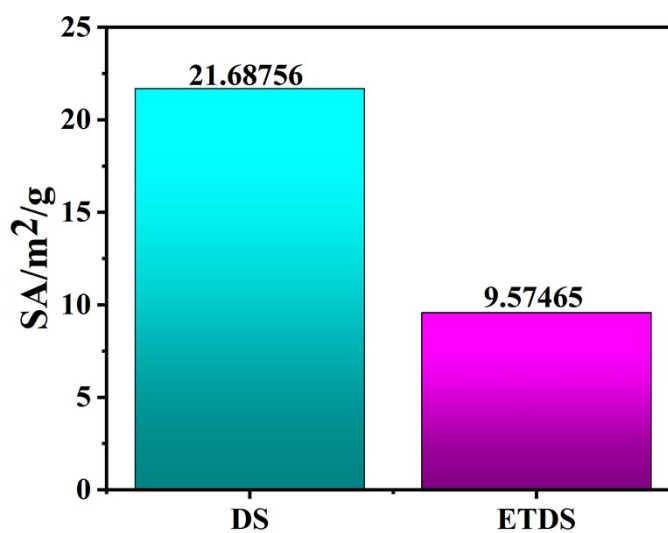
**Table S1** The EDS element composition of living diatoms (C, O, Si, N, P, Fe, Ca, Al).



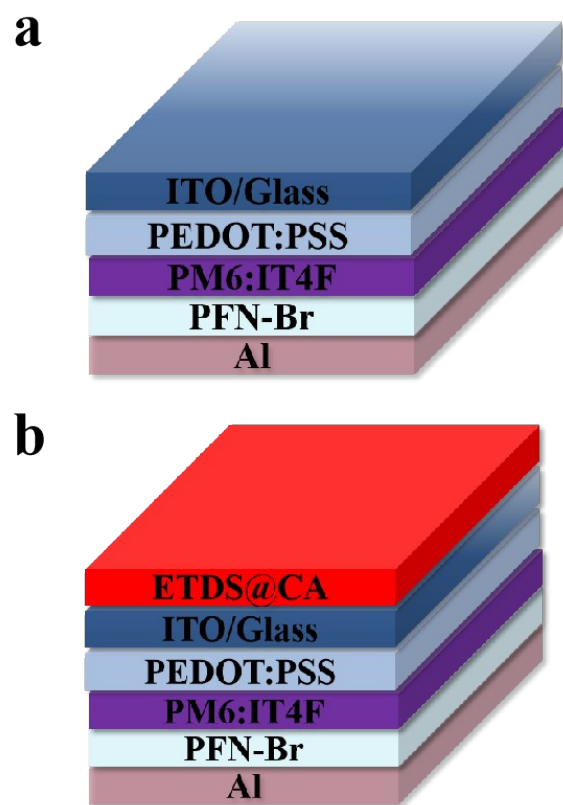
**Figure S2** The X-ray spectrum (EDS) of the diatom shell (a), and the X-ray spectrum (EDS) of the grafted diatom shell (b).

Sample	Elemental content (wt%)			
	O	Si	N	C
DS	59.81	29.98	4.71	7.16
DS-APTMS	21.77	7.83	18.52	51.47

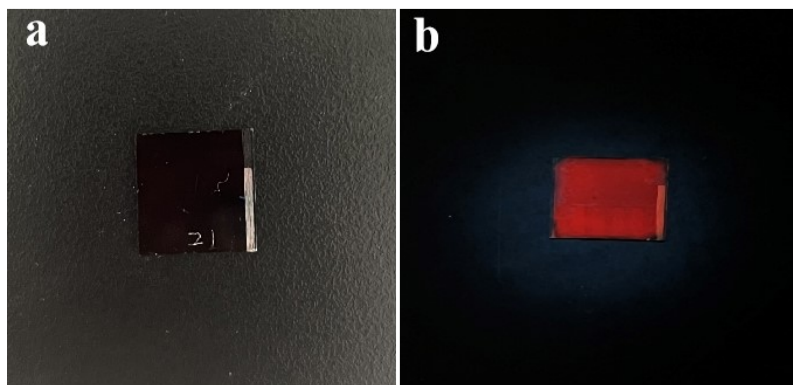
**Table S2** The EDS element composition of DS-APTMS and DS (O, Si, N, C).



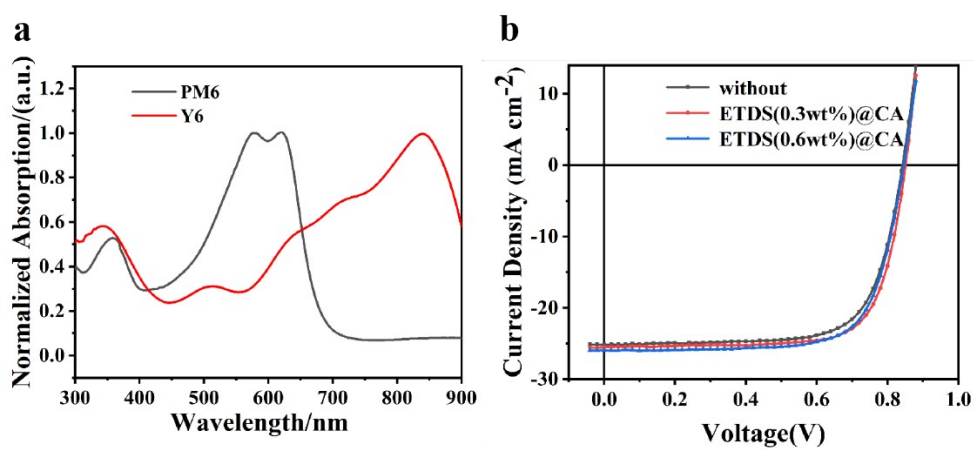
**Figure S3** The specific surface area (SA) plot of the DS and ETDS (b).



**Figure S4** Image of the original cell device (a), and the image of the optimized cell device (b).



**Figure S5** UV irradiation ETDS@CA spin coating to the device image (a) and (b).



**Figure S6** The film normalisation curves for PM6 and Y6 (a), and the J-V diagram of the rotary-coated ETDS@CA and original cells (b).