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Supplementary Information

Enhancing the energy conversion efficiency of low mobility solar cells by a 3D device architecture

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Fig S1(a-e) exhibits the schematic cross sections of solar cells with constant period, p, and height, h, but varying pyramid base, b_p. The period and height of the pyramid was kept constant at 600 nm and 600 nm. The base period of the pyramid was varied from 600 nm to 300 nm. The corresponding quantum efficienncy and short circuit current is shown in Fig. S1(f) and S1(g). The short circuit current density increases with increasing h/b_p ratio. The optical simulations show for example, that the short circuit current of a solar cell using a base period of 600 nm and a height of 1200 nm is equal to the short circuit current of a solar cell using a base period of 300 nm and a height of 600 nm, which confirms that an equal h/b_p ratio leads to equal short circuit current densities.

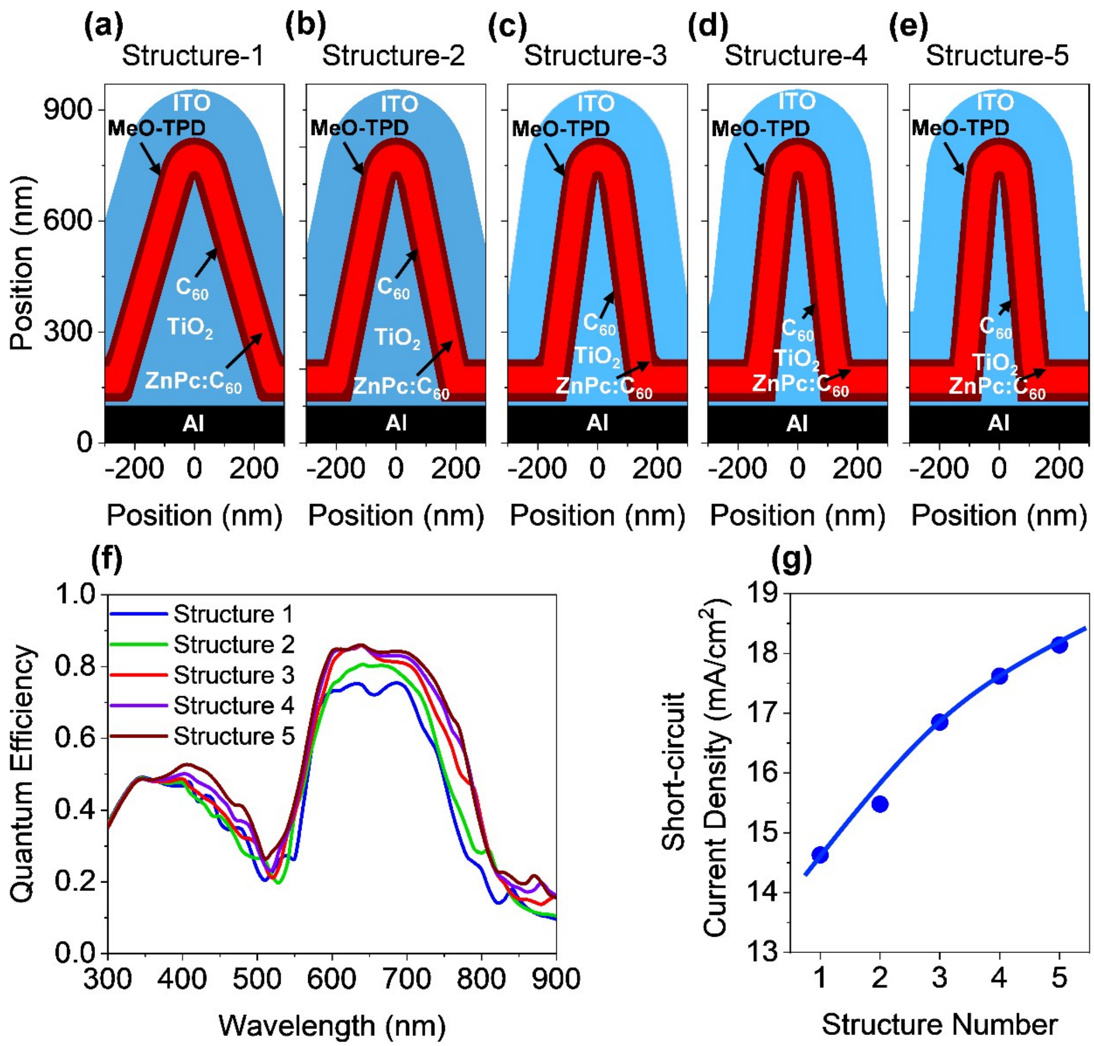

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Fig. S1. *(a-e) Cross sections, (f) a comparison of calculated quantum efficiency, and (g) a comparison of short-circuit current density of 3D or folded solar cells for different pyramid texture profile dimensions. The pyramid texture height is kept constant at 600 nm.*

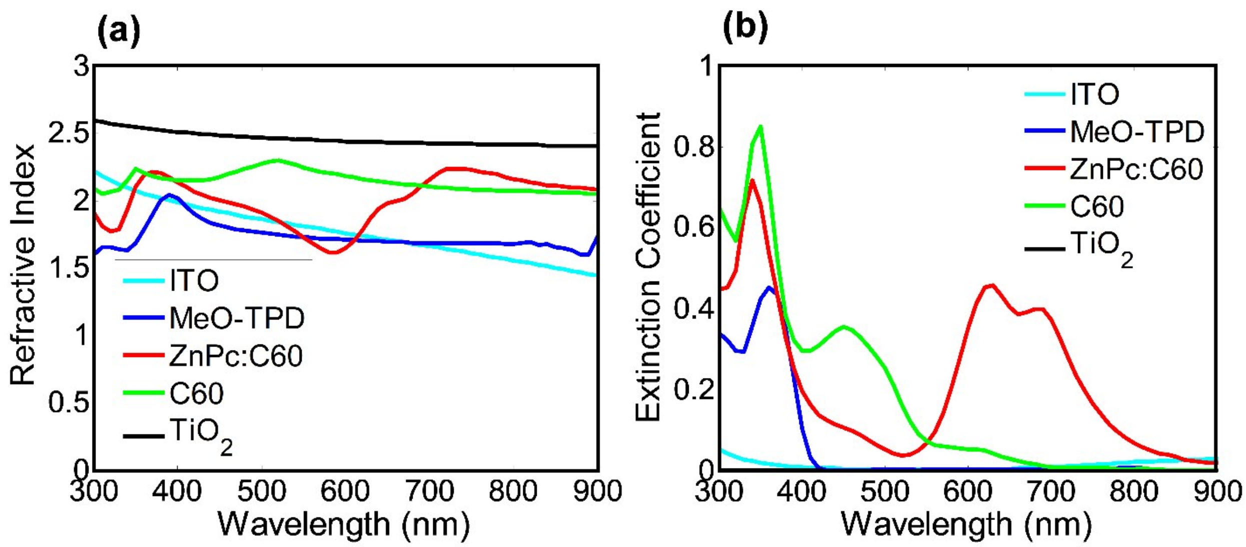

Fig. S2. *(a)Refractive index and (b) extinction coefficient of organic/inorganic materials used for the realization of small molecule planar and 3D or folded organic solar cells. Data are adapted from Ref. [35, 39-41].*