Supplementary Information

Interfacial self-assembly of nanoporous C$_{60}$ thin films

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Figure S1. Large scale SEM image of a nanostructured C$_{60}$ film and magnification (inset).
Figure S2. Flexibility of a C_{60} nanostructured thin film demonstrated by imaging over perpendicular surfaces of a silicon substrate.

Figure S3. TEM image of a nanostructured C_{60} film. The image shows 10-50 nm large C_{60} particles embedded in a C_{60} matrix.
Figure S4. SEM image of a C$_{60}$ film when depositing 250 µL CHCl$_3$ / C$_{60}$ solution at P=500 mbar on an area of 3.5 cm$^2$. For volumes over ~200 µL, overgrowth of large C$_{60}$ crystals occurs.

Figure S5. Solubility of C$_{60}$ films deposited on Si without light-induced polymerization. SEM images (a) Pristine C$_{60}$ film; (b) film residues after chloroform rinsing without prior light exposure.

Figure S6. Infiltration of stabilized C$_{60}$ nanostructures with P3HT. P3HT films were coated at 1000 rpm for 30 s from chloroform solutions. Red: maximum peak-to-valley
distance, grey: RMS roughness. Insets show SFM images of films obtained at 0, 1.25, 2.5 and 10 mg P3HT/mL.

**Figure S7.** Scanning force microscopy images of nanostructured C$_{60}$, after light exposure and partial P3HT coating (2.5 mg/mL, 1000 rpm). (a) SFM topography showing reduced height difference and filling of the voids in the C$_{60}$ layers, as well as the stability of the C$_{60}$ domains; (b) Electrostatic force microscopy phase showing C$_{60}$ domains (dark) and P3HT filling (bright).

**Figure S8.** Evolution of the morphology upon film drying and consecutive film stabilization. (a) SFM image of a nano-structured C$_{60}$ film after drying for 6 h at 80°C under nitrogen atmosphere and photo-polymerization, the inset shows the pristine film; (b) SFM image of the same area as (a) after solvent rinsing; (c) representative profiles extracted from (a) and (b).
**Figure S9.** SEM cross-section image of a light-stabilized planar bilayer C$_{60}$/P3HT solar cell.

**Figure S10.** Photoluminescence of P3HT films, the excitation wavelength was at 550 nm, all C$_{60}$ films were light-stabilized. (a) quenching of photoluminescence in architectures comparable to the ones used in solar cells, red: pristine P3HT, blue: on S-C$_{60}$, grey: on F-C$_{60}$, green: on F-C$_{60}$ + S-C$_{60}$. The photoluminescence intensity drops by 30% at 643 nm between F-C$_{60}$ and S-C$_{60}$/F-C$_{60}$. (b) UV-Vis of corresponding films showing a constant P3HT absorption.
Figure S11. Internal photon-to-current conversion efficiency (IPCE) measurements and corresponding $J_{SC}$. grey: F-C$_{60}$, green: 2 layers S-C$_{60}$ on F-C$_{60}$. 