Electronic Supplementary Information

For

In-Situ Modulation of the Vertical Distribution in a Blend of P3HT and PC_{60}BM via the Addition of a Composition Gradient for Improving Photovoltaic Performance

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1. Image of F-ADD film

![Image of F-ADD film](image)

**Fig. S1** An image of F-ADD film spun from chloroform (100 mg/mL) on a PEDOT:PSS-coated glass substrate.

2. UV-vis spectra of PC$_{60}$BM with F-ADD in chloroform

![UV-Vis spectra](image)

**Fig. S2** UV-Vis. absorption spectra of PC$_{60}$BM with F-ADD in 4.0 x 10$^{-4}$ M (a) and 1.3 x 10$^{-5}$ M chloroform solution.
2. Contact angle and surface energy

**Contact Angle (Water)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Droplet</th>
<th>Θ (°)</th>
<th>Type</th>
<th>Droplet</th>
<th>Θ (°)</th>
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</thead>
<tbody>
<tr>
<td>PCBM only</td>
<td>87.1</td>
<td></td>
<td>3 wt%</td>
<td>97.9</td>
<td></td>
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<tr>
<td>0.25 wt%</td>
<td>92.1</td>
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<td>5 wt%</td>
<td>100.6</td>
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<td>0.5 wt%</td>
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<tr>
<td>1 wt%</td>
<td>95.9</td>
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<td>P3HT only</td>
<td>101.2</td>
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</table>

**Contact Angle (Glycerol)**

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<th>Type</th>
<th>Droplet</th>
<th>Θ (°)</th>
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</thead>
<tbody>
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<tr>
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<td>55.6</td>
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<tr>
<td>0.5 wt%</td>
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<td>10 wt%</td>
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<tr>
<td>1 wt%</td>
<td>57.1</td>
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<td>P3HT only</td>
<td>90.2</td>
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</tbody>
</table>

**Fig. S3** Contact angles of PC$_{60}$BM containing various amounts of F-ADD on a PEDOT:PSS-coated substrate.
3. Secondary Ion Mass Spectrometry Result

![Graphs showing SIMS of P3HT:PC_{60}BM blend films with different F-ADD concentrations.](image)

**Fig. S4** SIMs of P3HT:PC_{60}BM blend films with 0 (a), 0.25 (b), 0.5 (c), 1.0 (d), 3.0 (e), 5.0 (f) and 10 (g) % of F-ADD.

4. Devices evaluations

![Graphs showing deviation of photovoltaic parameters of 8 devices polymer solar cells.](image)

**Fig. S5** Deviation of photovoltaic parameters of 8 devices polymer solar cells.
**Fig. S6** Devices data of polymer solar cells with 0 (a), 0.25 (b), 0.5 (c), 1.0 (d), 3.0 (e), 5.0 (f) and 10 (g) % of F-ADD.
**Fig. S7** IPCE curves of the polymer solar cells with 0 (a), 0.25 (b), 0.5 (c), 1.0 (d), 3.0 (e), 5.0 (f) and 10 (g) % of F-ADD
Fig. S8 Dark J-V characteristics of polymer solar cells with 0 (a), 0.25 (b), 0.5 (c), 1.0 (d), 3.0 (e), 5.0 (f) and 10 (g) % of F-ADD.
Fig. S9  Devices data of polymer solar cells 0 (a), 0.5 (b) wt % of F-ADD in various annealing conditions.