Supplementary Information

An electrode design rule for top-illuminated organic photovoltaics

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Method for calculating HOMO and LUMO levels:

To calculate the HOMO and LUMO levels from differential pulsed voltammetry the equations shown below were applied to the measured oxidation and reduction potentials to give the HOMO and LUMO respectively:

\[
HOMO = -1.2 \times \left( \frac{1^{st} \text{Oxidation} E_{\frac{1}{2} \text{Material}} - E_{\frac{1}{2} \text{Ferrocene}}}{1^{st} \text{Reduction} E_{\frac{1}{2} \text{Material}} - E_{\frac{1}{2} \text{Ferrocene}}} \right) - 4.8
\]

\[
LUMO = -1.2 \times \left( \frac{1^{st} \text{Reduction} E_{\frac{1}{2} \text{Material}} - E_{\frac{1}{2} \text{Ferrocene}}}{1^{st} \text{Oxidation} E_{\frac{1}{2} \text{Material}} - E_{\frac{1}{2} \text{Ferrocene}}} \right) - 4.8
\]

<table>
<thead>
<tr>
<th>Material</th>
<th>HOMO/ eV</th>
<th>LUMO/ eV</th>
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<tbody>
<tr>
<td>PC60BM</td>
<td>-6.16</td>
<td>-3.78</td>
</tr>
<tr>
<td>PC70BM</td>
<td>-6.05</td>
<td>-3.77</td>
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For both PC60BM and PC70BM the measured values are within the range reported in the literature using other measurement techniques.1-10
Figure S1: Step heights of AlCuAl and AlCuAl | PC\textsubscript{70}BM films measured using atomic force microscopy, showing how the organic semiconductor film thickness was determined. In this case the PC\textsubscript{70}BM solution concentration was 3 mg mL\textsuperscript{-1}, the spin speed was 6000 rpm and the film thickness was determined to be \textasciitilde 9 nm.

References