Supplementary Information

Crown-ether functionalized fullerene as solution-processable cathode buffer layer for high performance perovskite and polymer solar cells

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Fig. S1 AFM height images of the pristine P3HT:PC<sub>60</sub>BM and P3HT:PC<sub>60</sub>BM/PCBC films prepared on ITO/PEDOT:PSS substrates for a 5 μm x 5 μm surface area. The root-mean-square (RMS) roughnesses of the P3HT:PC<sub>60</sub>BM films with and without a PCBC layer on top are 15.9 and 19.9 nm, respectively.

Fig. S2 (a) The Nyquist plots (symbols) and fitted curves (solid curves) for the pero-SCs based on CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3-x</sub>Cl<sub>x</sub> without and with PCBC CBL, measured in the dark and with applied voltage near the V<sub>oc</sub> (0.97 V). (b) The equivalent circuit used for fitting the impedance data.
Table S1 The fitted ACIS parameters of planar pero-SCs based on CH$_3$NH$_3$PbI$_{3-x}$Cl$_x$.

<table>
<thead>
<tr>
<th>CBL</th>
<th>$R_{OS}$ ($\Omega$ cm$^2$)</th>
<th>$R_1$ ($\Omega$ cm$^2$)</th>
<th>CPE$_{1-T}$ ($\mu$F cm$^2$)</th>
<th>CPE$_{1-P}$</th>
<th>$R_2$ ($\Omega$ cm$^2$)</th>
<th>CPE$_{2-T}$ ($\mu$F cm$^2$)</th>
<th>CPE$_{2-P}$</th>
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<td>None</td>
<td>1.42</td>
<td>3.49</td>
<td>2.48</td>
<td>0.83</td>
<td>22.14</td>
<td>0.18</td>
<td>0.98</td>
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<tr>
<td>PCBC</td>
<td>1.32</td>
<td>4.04</td>
<td>0.52</td>
<td>0.94</td>
<td>13.96</td>
<td>0.14</td>
<td>1.03</td>
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