High Brightness Solution-Processed OLEDs Employing Linear, Small Molecule Emitters


Supporting Information
**Figure S1:** Thermogravimetric analysis of Green 1.

**Figure S2:** Thermogravimetric analysis of Green 2.
**Figure S3:** Differential scanning calorimetry of **Green 1**.

**Figure S4:** Differential scanning calorimetry of **Green 2**.
**Figure S5:** Oxidation profile of Green 1 in dichloromethane (10^{-4} M), using a glassy carbon, platinum wire and Ag wire as the working, counter and pseudo-reference electrodes respectively, with (nBu)_{4}PF_{6} as the electrolyte in dichloromethane solution (0.1 M) at a scan rate of 100 mV/s. The data were referenced to the Fc/Fc^{+} redox couple, which has a HOMO of -4.8 eV.

**Figure S6:** Reduction profile of Green 1 in dichloromethane (10^{-4} M), using a glassy carbon, platinum wire and Ag wire as the working, counter and pseudo-reference electrodes respectively, with (nBu)_{4}PF_{6} as the electrolyte in dichloromethane solution (0.1 M) at a scan rate of 100 mV/s. The data were referenced to the Fc/Fc^{+} redox couple, which has a HOMO of -4.8 eV.
**Figure S7:** Oxidation profile of **Green 2** in dichloromethane (10^{-4} M), using a glassy carbon, platinum wire and Ag wire as the working, counter and pseudo-reference electrodes respectively, with (nBu)_4PF_6 as the electrolyte in dichloromethane solution (0.1 M) at a scan rate of 100 mV/s. The data were referenced to the Fc/Fc^+ redox couple, which has a HOMO of -4.8 eV.

![Oxidation profile of Green 2](image)

**Figure S8:** Reduction profile of **Green 2** in dichloromethane (10^{-4} M), using a glassy carbon, platinum wire and Ag wire as the working, counter and pseudo-reference electrodes respectively, with (nBu)_4PF_6 as the electrolyte in dichloromethane solution (0.1 M) at a scan rate of 100 mV/s. The data were referenced to the Fc/Fc^+ redox couple, which has a HOMO of -4.8 eV.

![Reduction profile of Green 2](image)
**Figure S9:** schematic energy level diagram of **Green 1** and **Green 2** device architectures.

**Figure S10:** log-log plot of JV characteristics of **Green 1** and **Green 2** devices.
Figure S11: Current density – voltage - electroluminescence (JVL) characteristics of unannealed and annealed Green 1 with device architectures of ITO/PEDOT-PSS/Green1/ Ca/Al.

Figure S12: Current density – voltage - electroluminescence (JVL) characteristics of unannealed and annealed Green 2 with device architectures of ITO/PEDOT-PSS/Green2/ Ca/Al.
Figure S13a: Current efficiency – voltage characteristics of unannealed and annealed Green 1 devices with device architectures of ITO/PEDOT-PSS/Green1/Ca/Al.

Figure S13b: External quantum efficiency (EQE) – current density characteristics of un-annealed and annealed Green 1 devices with device architectures of ITO/PEDOT-PSS/Green1/Ca/Al.
**Figure S14a:** Current efficiency – voltage characteristics of unannealed and annealed Green 2 devices with device architectures of ITO/PEDOT-PSS/Green2/Ca/Al.

![Current Efficiency vs. Applied Voltage](image1)

**Figure S14b:** External quantum efficiency (EQE) – current density characteristics of unannealed and annealed Green 2 devices with device architectures of ITO/PEDOT-PSS/Green2/Ca/Al.

![External Quantum Efficiency vs. Current Density](image2)
**Figure S15:** Current density – voltage - electroluminescence (JVL) characteristics of **Green 1** and **Green 2** with device architectures of ITO/PEDOT-PSS/\texttt{Green}/Alq3/Ca/Al.

**Figure S16a:** Current efficiency – voltage characteristics of **Green 1** and **Green 2** with device architectures of ITO/PEDOT-PSS/\texttt{Green}/Alq3/Ca/Al.
Figure S16b: External quantum efficiency (EQE) – current density characteristics of Green 1 and Green 2 with device architectures of ITO/PEDOT-PSS/Green/Alq3/Ca/Al.

Table S1: Summary of absolute PLQY values (solid state) and CIE coordinates for Green 1 and Green 2 devices (ITO/PEDOT-PSS/Green/Ca/Al). PLQY recorded at excitation wavelengths of 346 and 365 nm for Green 1 and Green 2, respectively.

<table>
<thead>
<tr>
<th>Material</th>
<th>PLQY</th>
<th>CIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green 1</td>
<td>90.4%</td>
<td>X = 0.424; Y = 0.555; Z = 0.021</td>
</tr>
<tr>
<td>Green 2</td>
<td>73.7%</td>
<td>X = 0.432; Y = 0.552; Z = 0.016</td>
</tr>
</tbody>
</table>

Table S2: Summary of maximum luminance vs annealing temperature for Green 1 and Green 2 devices with the device architecture of ITO/PEDOT-PSS/Green 1 or 2/Alq3/Ca/Al, with annealing at 40 °C.

<table>
<thead>
<tr>
<th>Material</th>
<th>Turn on at 10 cd/m² (V)</th>
<th>Maximum Luminance (cd/m²)</th>
<th>Maximum current efficiency (cd/A)</th>
<th>Maximum EQE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green 1</td>
<td>9.27</td>
<td>4702 @ 14.10 V</td>
<td>1.11 @ 12.18 V</td>
<td>0.31 @ 12.15 V</td>
</tr>
<tr>
<td>Green 2</td>
<td>5.87</td>
<td>17189 @ 11.9 V</td>
<td>3.47 @ 10.68 V</td>
<td>0.92 @ 10.68 V</td>
</tr>
</tbody>
</table>
Figure S17: 1H NMR spectrum of Green 1.

Figure S18: 1H NMR spectrum of Green 2.
Figure S19: 1H NMR spectrum of compound 3.