Supporting Information
for

Improvement of lifetime for polymer light-emitting diode by introducing solution processed tungsten-oxide

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\textbf{Figure S1.} (a) Current density - voltage ($J$ - $V$) and (b) luminance-voltage ($L$-$V$) characteristics of the devices: devices A (black solid line), B (red dash line), C (green dot line) and D (blue dash dot line).
Figure S2. Average values of (a) driving voltage, (b) current efficiency and (c) power efficiency at 1000 cd/m² with error bar.
Figure S3. (a) Current density - voltage (J - V), (b) luminance-voltage (L-V), (c) current efficiency – luminance and (d) power efficiency - luminance characteristics of the devices: devices with WO$_x$ as only HIL material (black solid line), WO$_x$/PEDOT:PSS as HIL (red dash line), WO$_x$/PEDOT:PSS/WO$_x$ as HIL (blue dash dot line).
Figure S4. Lifetime of devices A (black circle), B (red triangle), C (green rectangle) and D (blue diamond) at 1000 cd/m$^2$ with projected straight lines.

Figure S5. Luminance degradation data of devices A (black solid line), B (red dash line), C (green dot line) and D (green dash dot line) were measured at 10000 cd/m$^2$. 
**Figure S6.** The TEM images of the devices without operation; (a) device A and (b) device D.

**Figure S7.** The atomic concentration profile from cross-sectional EDX spectra of the devices without operation; (a) device A and (b) device D: Al (dark red solid line), In (orange dot line), S (dark yellow dash line) and W (green dash double dot line).