Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.
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Supporting Information

Solution-processed Electron Only Tandem Polymer Light-Emitting Diodes for Broad Wavelength Light Emission

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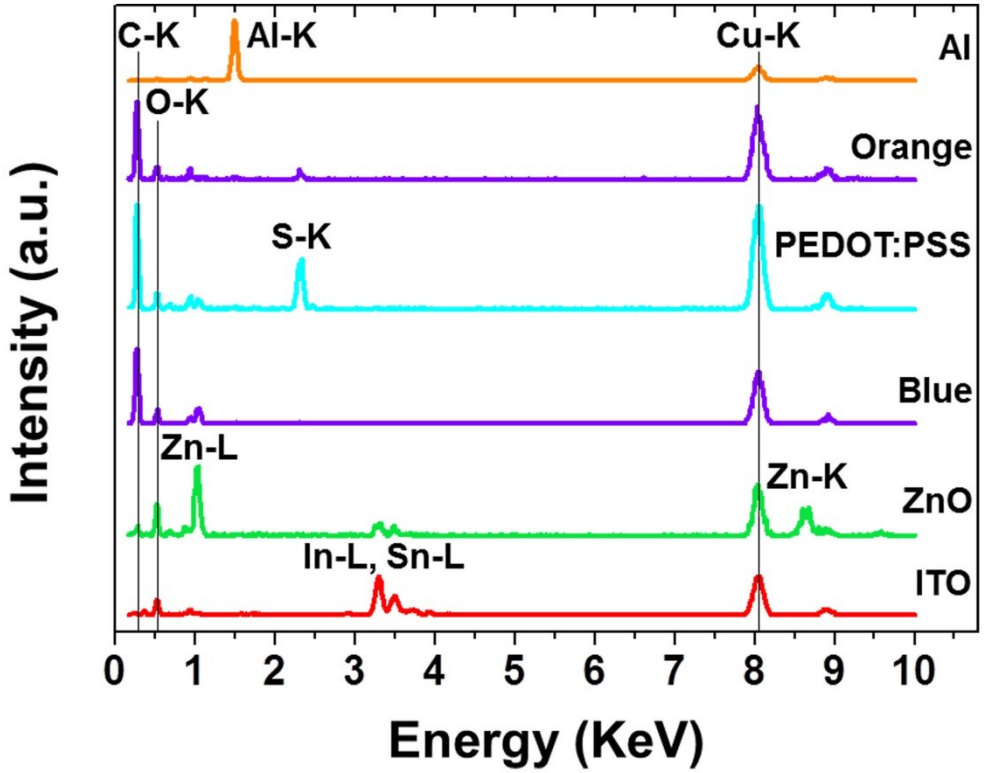

Figure S1. TEM-EDX spectra of blue/orange tandem PLEDs with multivariate statistical analysis as different characteristic elements.

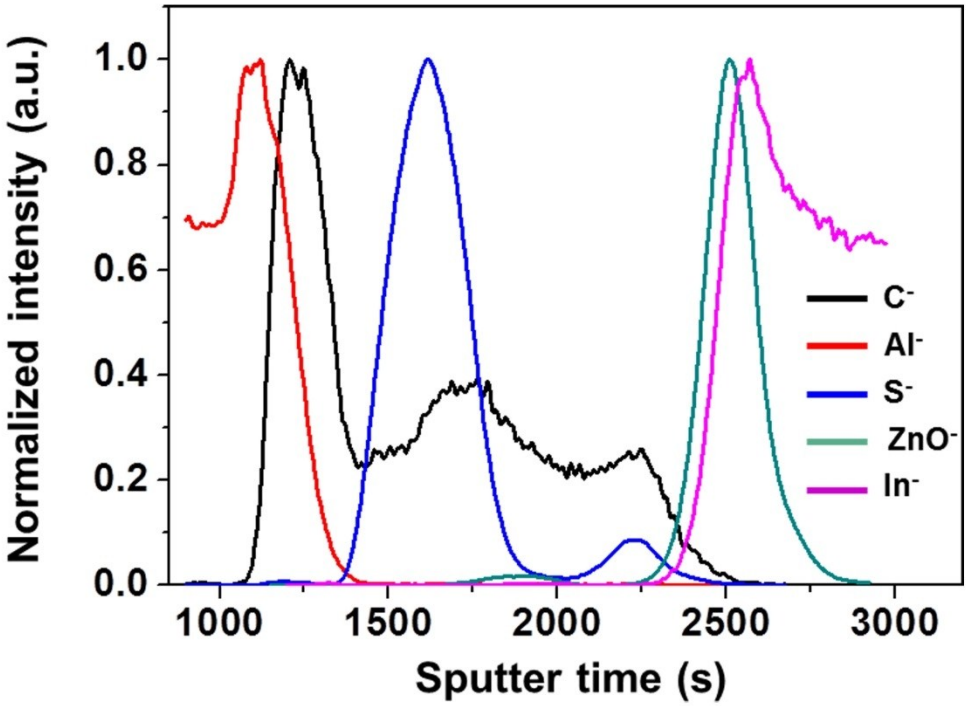

Figure S2. Normalized ToF-SIMS depth profiles of the blue/orange tandem PLED.

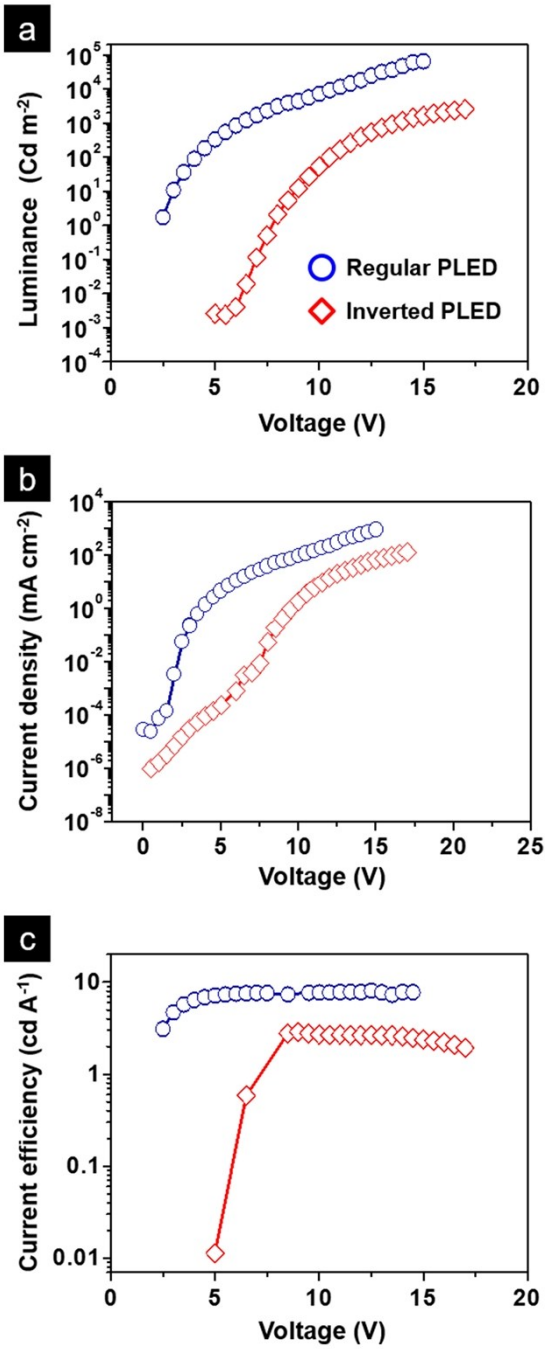

Figure S3. (a) Luminance (cd m^{-2}), (b) current density (mA cm^{-2}), and (c) CE (cd A^{-1}) characteristics with respect to voltage (V) of a single regular and inverted PLEDs were investigated. The regular PLED was consisted of ITO/AI4083/Orange/LiF/Al. And the inverted PLED was consisted of ITO/ZnO/PEI/Blue/Ai4083/Al.

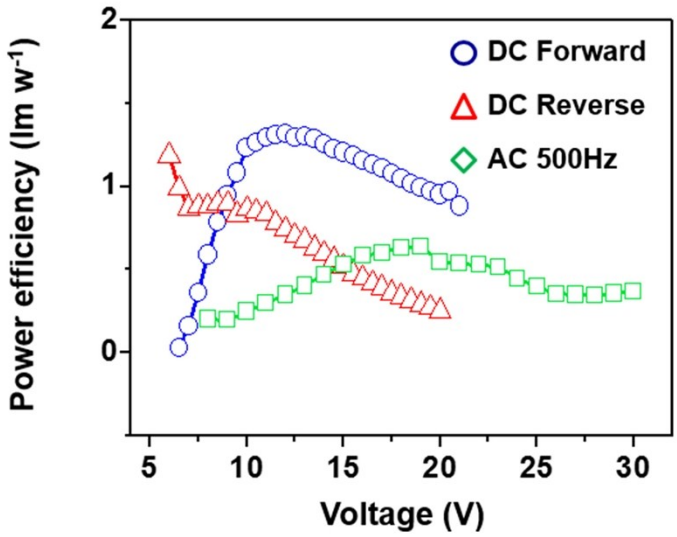

Figure S4. Power efficiency *versus* voltage characteristics of blue/orange tandem PLEDs under DC reverse, forward bias and AC bias with frequency of 500 Hz.

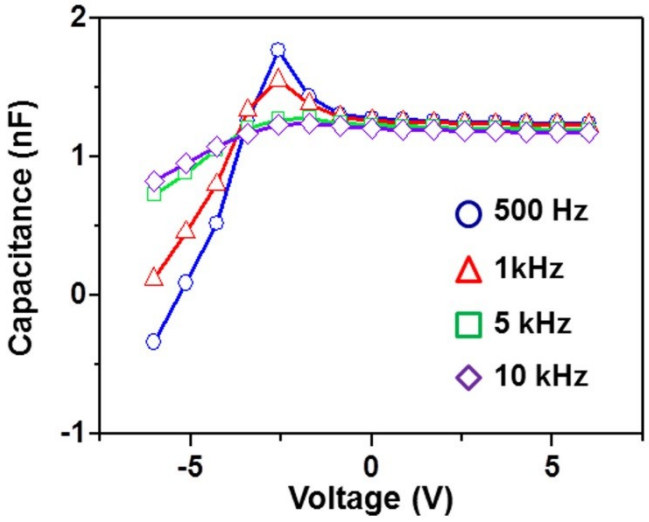

Figure S5. Capacitance *versus* voltage characteristics of the regular PLEDs consisted of ITO/AI4083/Orange/LiF/Al as a function of frequency.

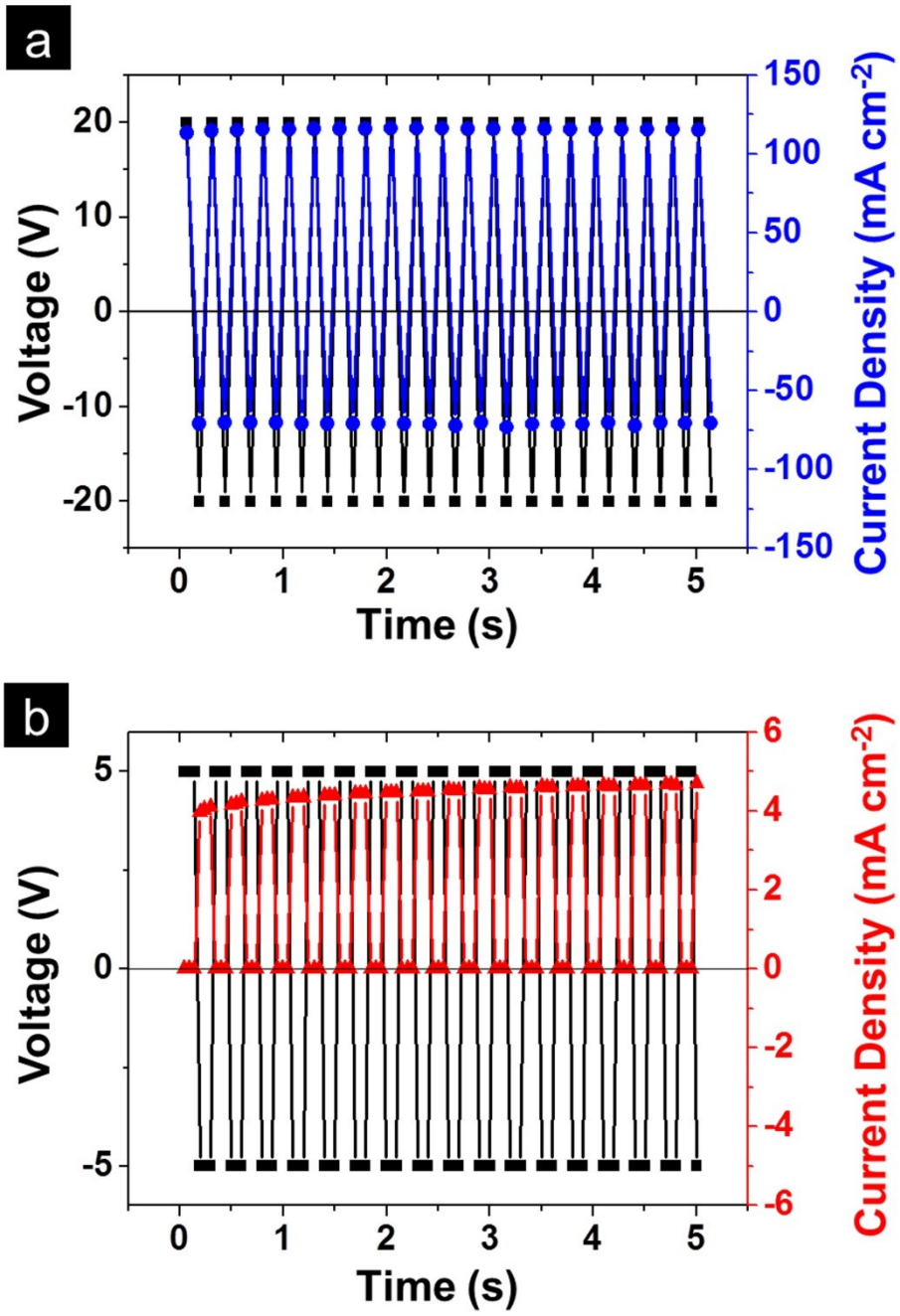

Figure S6. Plots of the time-resolved current density (mA cm^{-2}) versus voltage (V) for (a) the bottom blue/top orange tandem PLED and (b) an inverted PLED consisted of ITO/ZnO/PEI/Blue/Ai4083/Al for dynamic switching response.

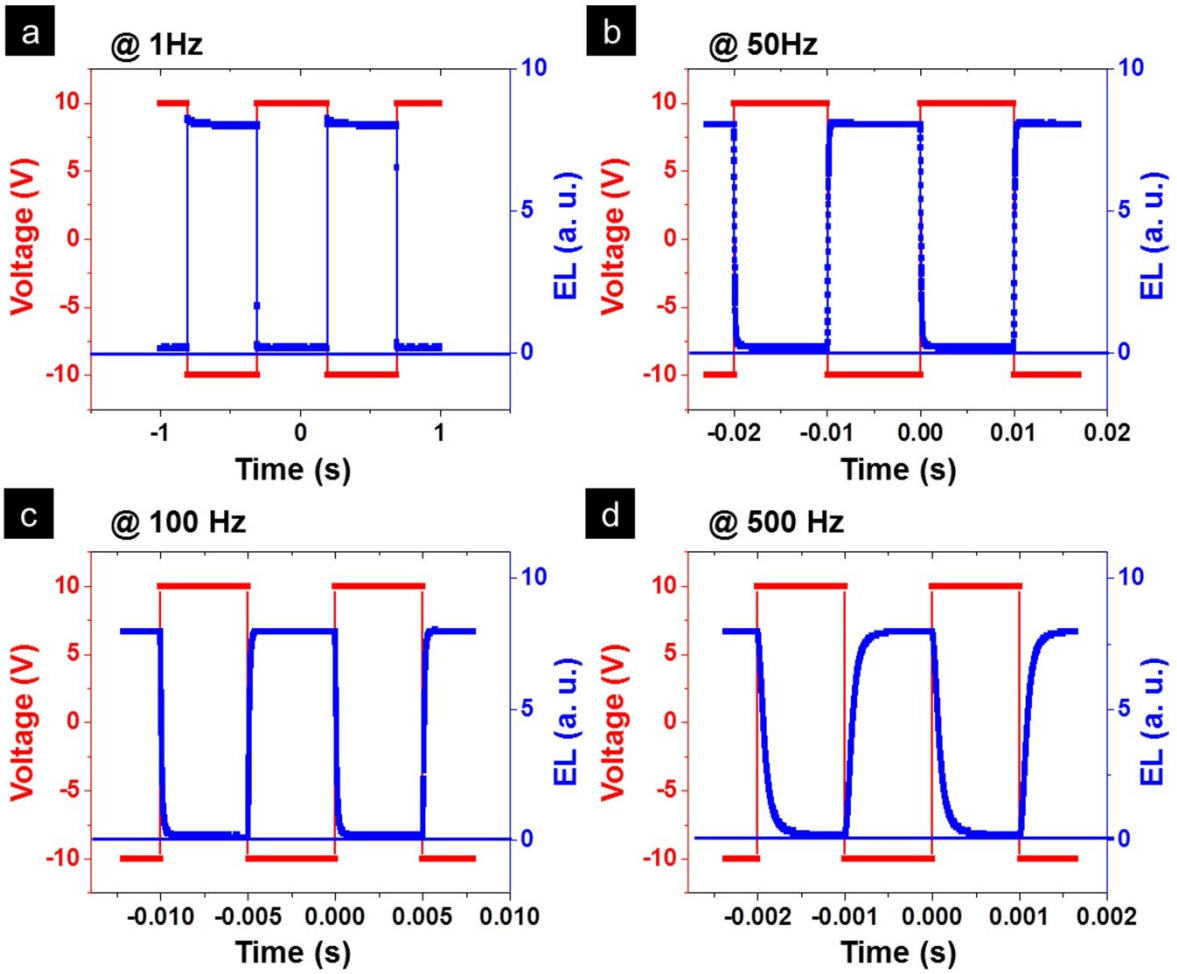

Figure S7. The time-resolved EL signals of a single inverted PLED device consisted of ITO/ZnO/PEI/Blue/Ai4083/Al under successive ±10 V square-pulsed voltage trains with a frequency of (a) 1, (b) 50, (c) 100, and (d) 500 Hz.

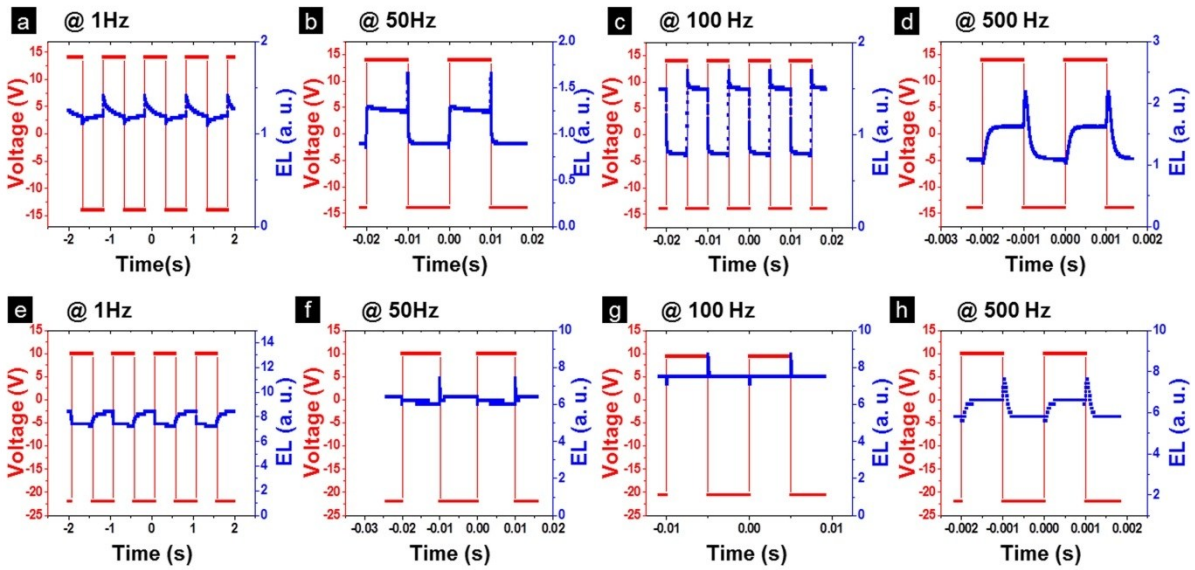

Figure S8. The time-resolved EL signals of a bottom blue and top orange tandem PLED device under successive ±14 V square-pulsed voltage trains with a frequency of (a) 1, (b) 50, (c) 100, and (d) 500 Hz and under asymmetric positive and negative voltage heights of +10:−22 V with the frequency of (e) 1, (f) 50, (g) 100, and (h) 500 Hz.

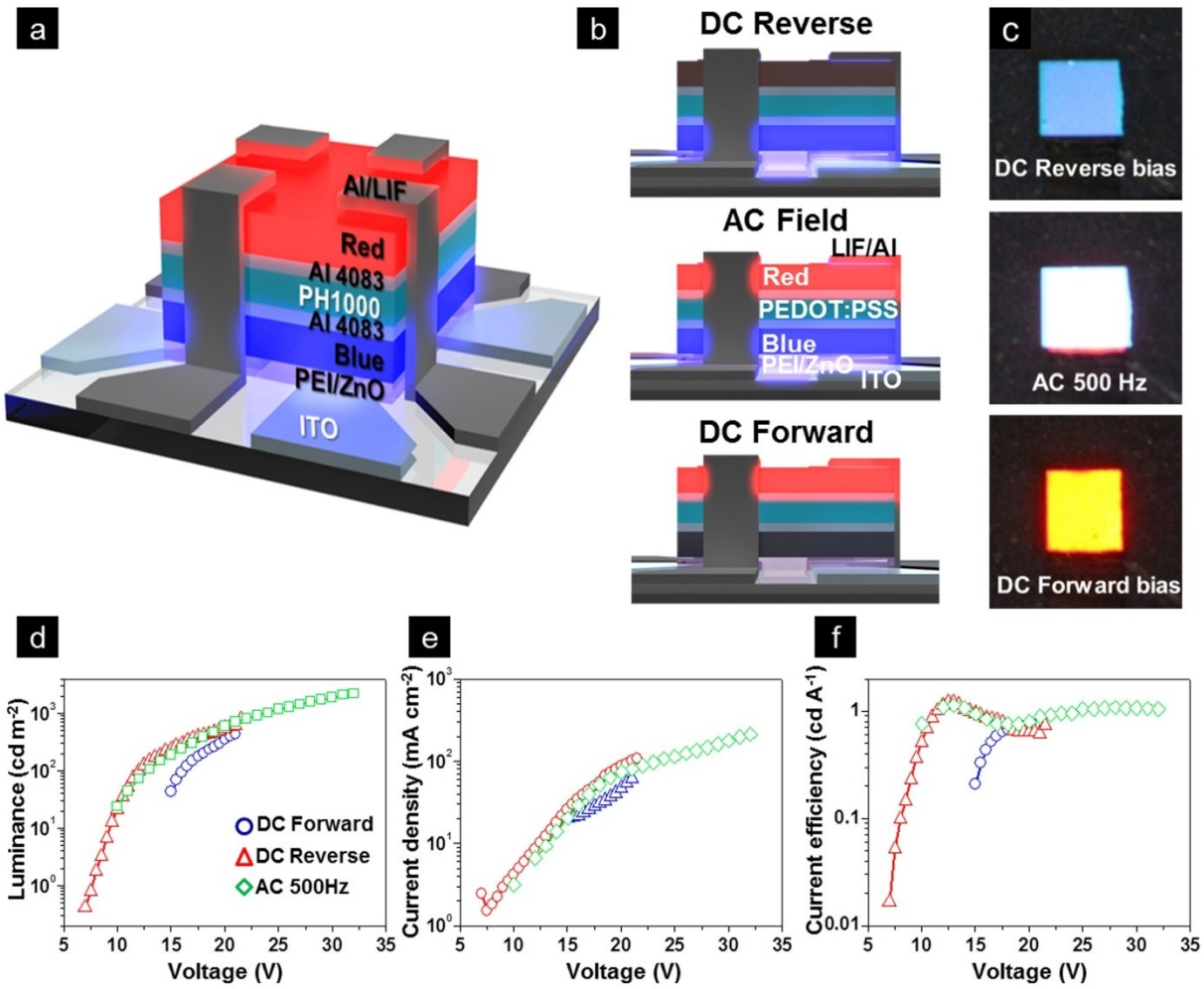

Figure S9. (a) Schematic of bottom blue and top red tandem PLEDs. (b) The operation mechanism and (c) operation photographs under reverse DC, forward DC, and AC biases. The (d) Luminance (cd m^{-2}), (e) current density (mA cm^{-2}), and (f) CE (cd A^{-1}) characteristics with respect to voltage (V) of a top red/bottom blue tandem PLED were investigated under reverse DC, forward DC, and AC biases.

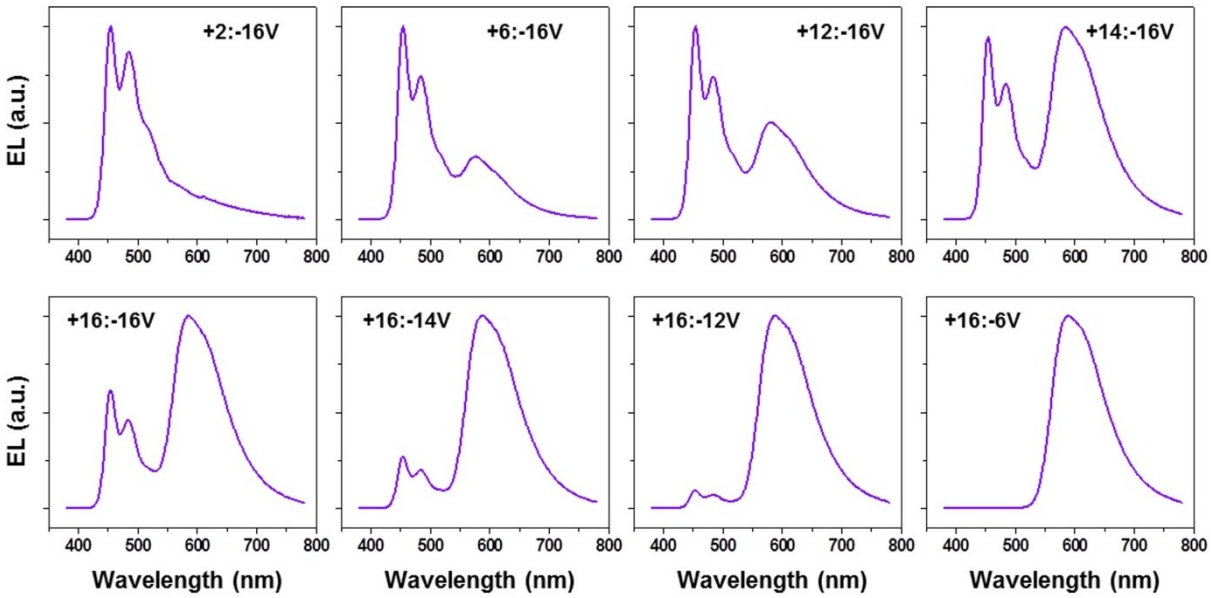

Figure S10. EL spectra of a tandem PLED with bottom ~~blue~~ and top orange LEUs operated under AC bias with asymmetric positive and negative voltage heights of +2:−16 V, +6:−16 V, +12:−16 V, +14:−16 V, +16:−16 V, +16:−14 V, +16:−14 V, and +16:−12 V at an AC frequency of 500 Hz.

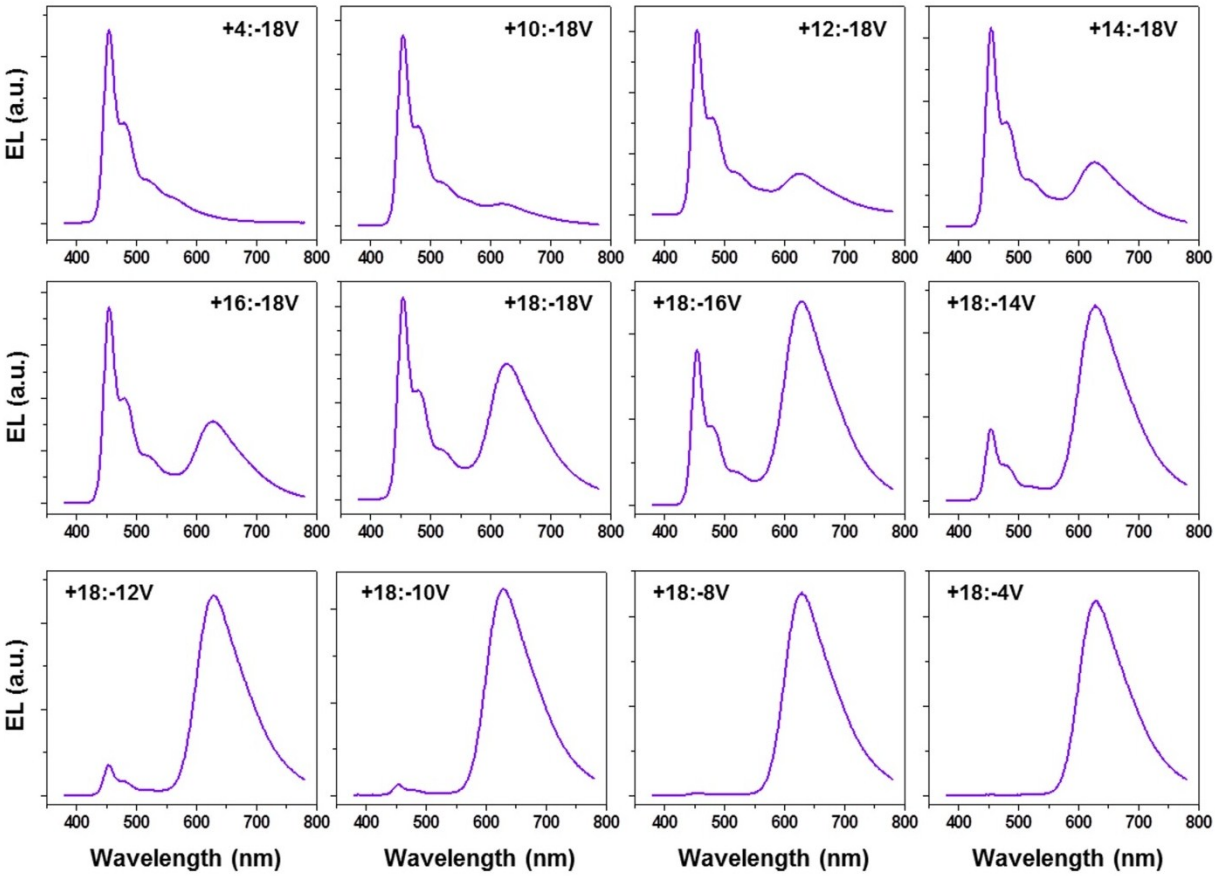

Figure S11. EL spectra of a tandem PLED with bottom blue and top red LEUs operated under AC bias with asymmetric positive and negative voltage heights of +4:−18 V, +10:−18 V, +12:−18 V, +14:−18 V, +16:−18 V, +18:−18 V, +18:−16 V, and +18:−14 V, +18:−12 V, +18:−10 V, +18:−8 V, and +18:−4 V at an AC frequency of 500 Hz.