Supplementary information

Low-Temperature Cross-Linking of Polyethyleneimine Ethoxylated Using Silane Coupling Agents to Obtain Stable Electron Injection Layers in Solution-Processed Organic Light-Emitting Devices

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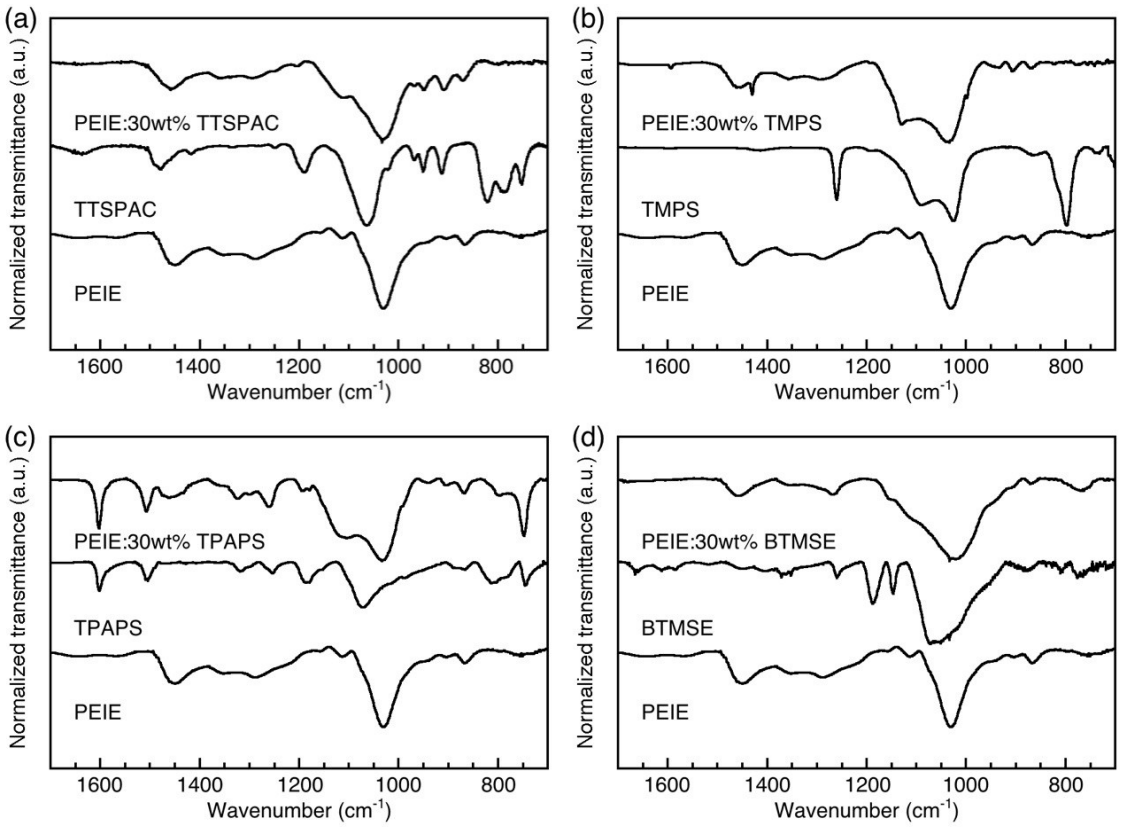

Figure S1. Infrared spectra of (a) PEIE, TTSPAC and PEIE: 30 wt% TTSPAC, (b) PEIE, TMPS and PEIE: 30 wt% TMPS, (c) PEIE, TPAPS and PEIE: 30 wt% TPAPS and (d) PEIE, BTMSE and PEIE: 30 wt% BTMSE.

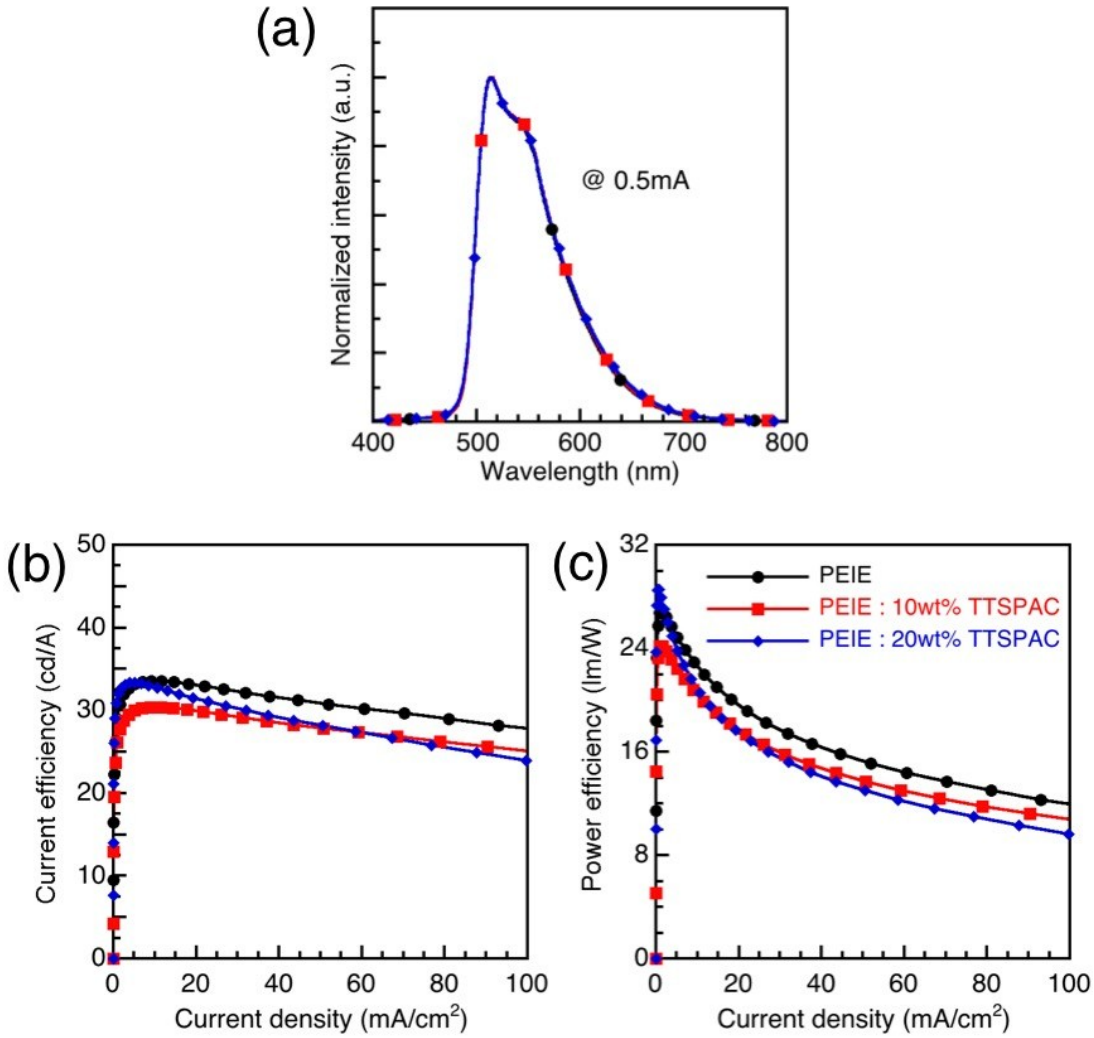

Figure S2. Characteristics of devices with PEIE, PEIE: 10 wt% TTSPAC and PEIE: 20 wt% TTSPAC EILs. (a) EL spectra, (b) power efficiency–current density (*J*), and (c) current efficiency–*J* characteristics.

Table S1. Performances of devices with PEIE, PEIE: 10 wt% TTSPAC and PEIE: 20 wt% TTSPAC EILs.

SCAs	$V_{on}/\eta_{p,on}/\eta_{c,on}/\eta_{ext,on}$ [V/%/cd A^{-1}/lm W^{-1}][a]	$V_{100}/\eta_{p,100}/\eta_{c,100}/\eta_{ext,100}$ [V/%/cd A^{-1}/lm W^{-1}] [b]	$V_{1000}/\eta_{p,1000}/\eta_{c,1000}/\eta_{ext,1000}$ [V/%/cd A^{-1}/lm W^{-1}] [c]	LT_{50} [h][d]
w/o	2.61/2.8/9.6/11.7	3.15/7.4/25.2/25.0	3.91/9.4/32.3/26.0	22.3
10wt% TTSPAC	2.60/1.2/4.2/5.0	3.16/6.8/23.0/23.0	3.96/8.6/29.2/23.5	21.0
20wt% TTSPAC	2.50/3.3/11.4/14.2	3.17/8.4/28.6/28.6	4.05/9.7/33.2/25.5	13.0

[a] Driving voltage (V), power efficiency (η_p), current efficiency (η_c) and external quantum efficiency (η_{ext}) at 1 cd m^{-2}. [b] η_p, η_c and η_{ext} at 100 cd m^{-2}. [c] η_p, η_c and η_{ext} at 1000 cd m^{-2}. [d] Device's luminance half-lifetimes at 5 mA/cm^2.

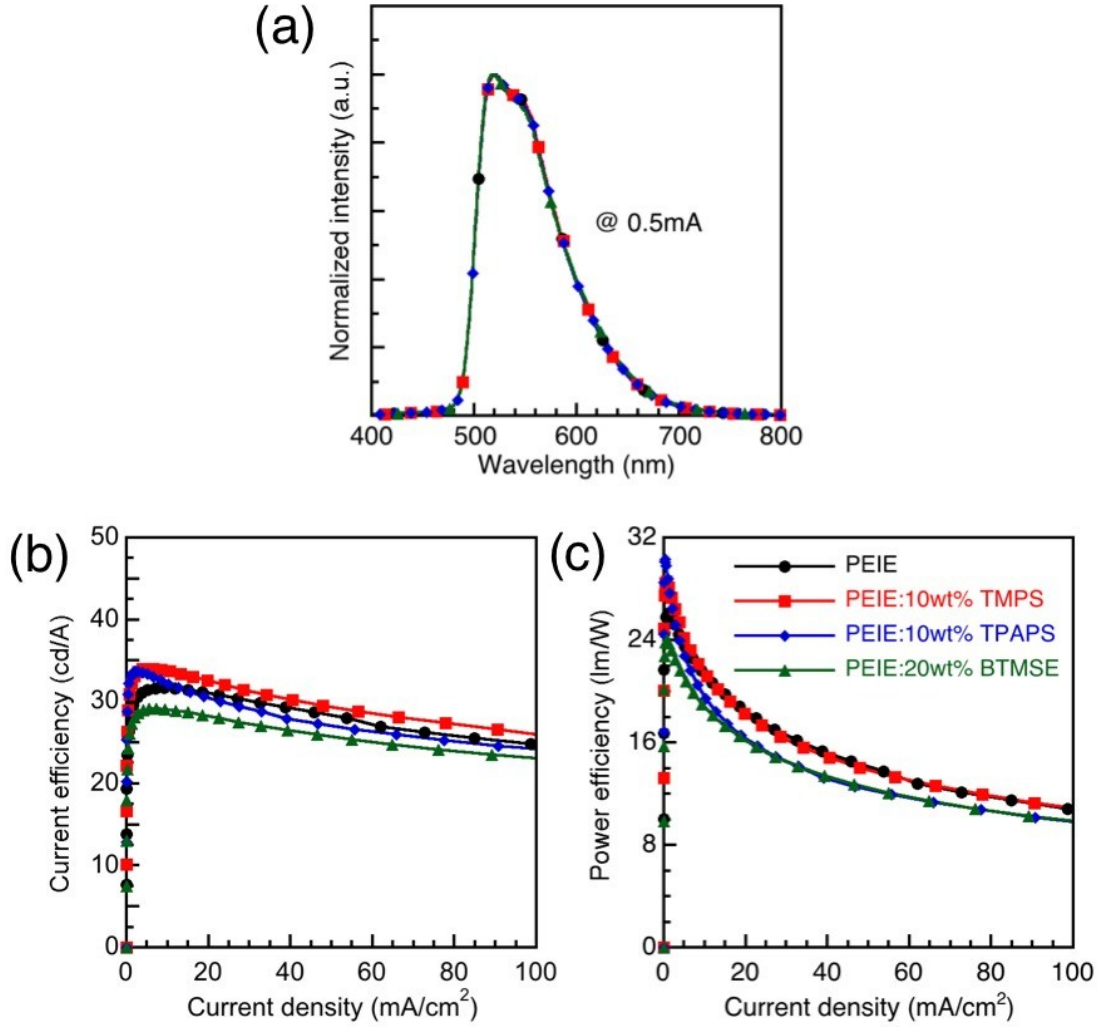

Figure S3. Characteristics of devices with PEIE, PEIE: 10 wt% TMPS, PEIE: 10 wt% TPAPS and PEIE: 20 wt% BTMSE EILs. (a) EL spectra, (b) power efficiency–current density (*J*), and (c) current efficiency–*J* characteristics.

Table S2. Performances of devices with PEIE, PEIE: 10 wt% TMPS, PEIE: 10 wt% TPAPS and PEIE: 20 wt% BTMSE EILs.

SCAs	$V_{on}/\eta_{p,on}/\eta_{c,on}/\eta_{ext,on}$ [V/%/cd A^{-1}/lm W^{-1}][a]	$V_{100}/\eta_{p,100}/\eta_{c,100}/\eta_{ext,100}$ [V/%/cd A^{-1}/lm W^{-1}] [b]	$V_{1000}/\eta_{p,1000}/\eta_{c,1000}/\eta_{ext,1000}$ [V/%/cd A^{-1}/lm W^{-1}] [c]	LT_{50} [h][d]
w/o	2.46/2.8/9.6/12.1	3.11/7.2/25.0/25.3	3.92/8.9/30.9/24.8	22.3
10wt% TMPS	2.45/3.4/11.7/14.9	3.13/8.1/28.0/28.1	4.04/9.7/33.7/26.2	38.7
10wt% TPAPS	2.43/4.1/14.0/18.1	3.17/8.8/30.5/30.3	4.22/9.7/33.6/25.1	33.3
20wt% BTMSE	2.49/2.9/10.0/12.5	3.22/7.2/24.5/23.8	4.11/8.4/28.8/22.0	52.9

[a] Driving voltage (*V*), power efficiency (η_p), current efficiency (η_c) and external quantum efficiency (η_{ext}) at 1 cd□m^{-2}. [b] η_p, η_c and η_{ext} at 100 cd m^{-2}. [c]□η_p, η_c and η_{ext} at 1000 cd m^{-2}. [d] Device's luminance half-lifetimes at 5 mA/cm^2.