Electronic Supplementary Information

$[Ir(ppy)_2pyim]PF_6$ dielectric mixed with PMMA for area emission transistors

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Experimental section

Device Fabrication: First, ZTO layer (40 nm) was formed on the ITO substrate by the way published.[1] The channel length and width are 35 μm and 1000 μm, respectively. $[Ir(ppy)_2pyim]PF_6$ was mixed with different mass concentration ratios of PMMA: 25% (device A), 33% (device B) and 66% (device C). The total concentration was 25 mg mL^{-1} (in CH_2Cl_2). Then, the mixed solutions were spin-coated at 1500 rpm and baked at 80 °C for 20 minutes. Finally, Ag electrode of 80 nm was evaporated at an evaporating rate of 0.5~1 $A^{\circ}s^{-1}$.

Electrical and electroluminescent measurements: Measurements were all carried out in ambient conditions. The Keithley 4200 semiconductor characterization system was used to measure the electrical properties. The Photo Research PR705 spectro-photometer was used to collect the electroluminescent spectrum.

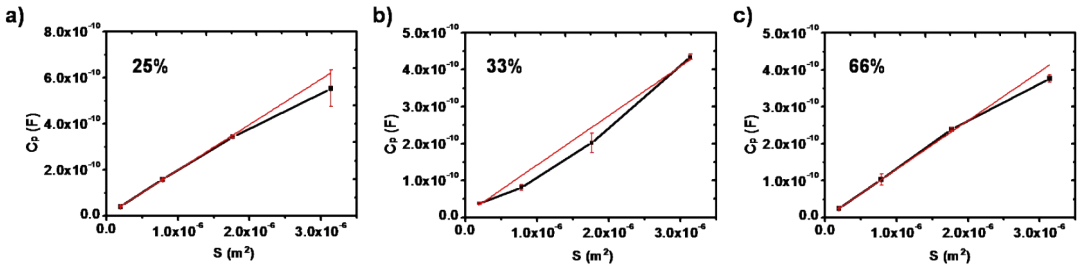

Figure S1. The capacitance information of mixed films from which the dielectric constants are calculated by the following expressions :

$$C_i = \frac{C_p}{S}$$

$$C_i = \frac{\varepsilon_0 \varepsilon_r}{d}$$

(d: the thickness of film; ε_0: permittivity of vacuum)

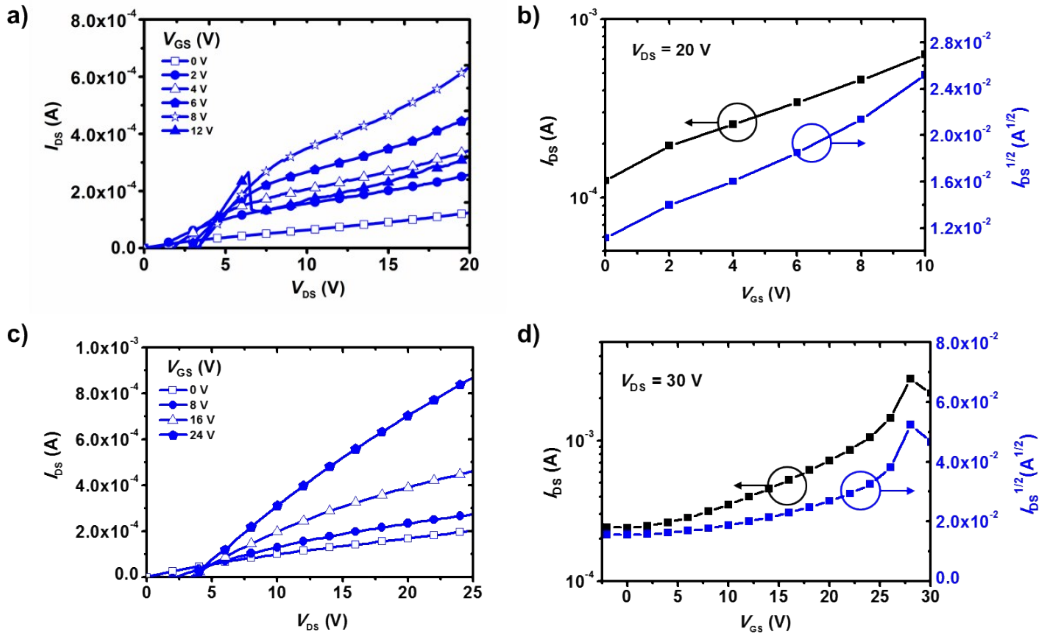

Figure S2. Transistor characteristics: (a) the output curves of the Device A; (b) the transfer curves of the Device A; (c) the output curves of the Device C; (d) the transfer curves of the Device C.

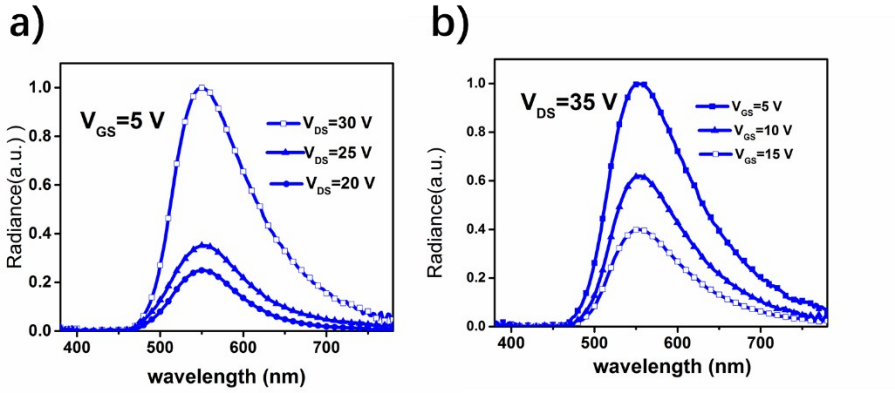

Figure S3. EL peak showed almost no shift when a) V_{DS} and b) V_{GS} varied

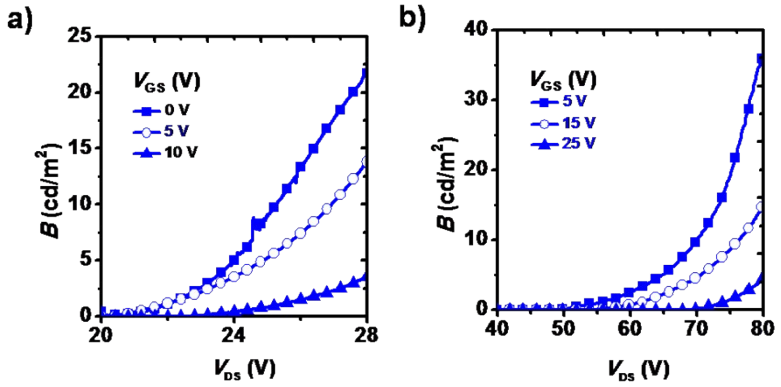

Figure S4. Control of emission via V_{DS} and V_{GS} for Device A (a) and Device C (b).

References:

(1) Y. L. Zhao, L. Duan, G. Dong, D. Q. Zhang, J. Qiao, L. Wang and Y. Qiu,

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