

Electronic Supplementary Information

White OLEDs Based on a Novel Eu^{III} -Tetrakis- β -Diketonate Doped into 4,4'-*N,N'*-Dicarbazolebiphenyl as Emitting Material†

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Table S1. CIE coordinates and emission colours of the devices ITO/PEDOT: PSS (50 nm)/NBu₄ [EuL₄] (10% or 20%): CBP (63% or 56%)-OXD7 (27% or 24%) (50 nm)/TPBI (50 nm)/LiF (1.5 nm)/Al (120 nm) at different voltages.

10% NBu ₄ [EuL ₄]			
Voltage	x	y	Colour
6V	0.612	0.322	Red
7V	0.598	0.313	Red
8V	0.394	0.342	White
9V	0.337	0.321	White
10V	0.302	0.297	White
11V	0.295	0.274	White
12V	0.274	0.270	White
13V	0.261	0.272	White
20% NBu ₄ [EuL ₄]			
6V	0.617	0.311	Red
7V	0.576	0.300	Red
8V	0.339	0.328	White
9V	0.328	0.282	White
10V	0.302	0.272	White
11V	0.295	0.274	White
12V	0.279	0.263	White
13V	0.262	0.260	White

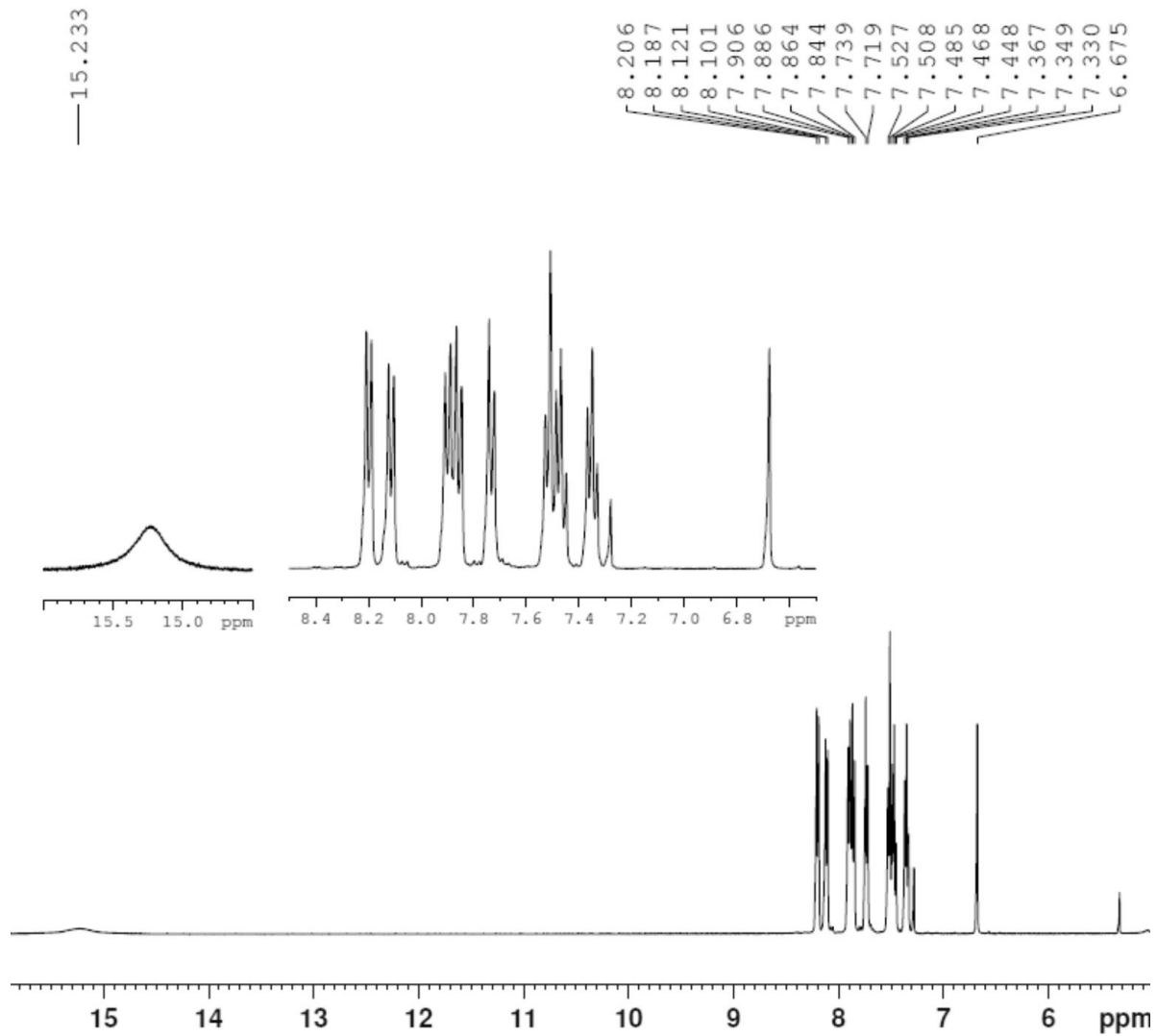


Fig. S1 ^1H NMR Spectrum of HL in CDCl_3

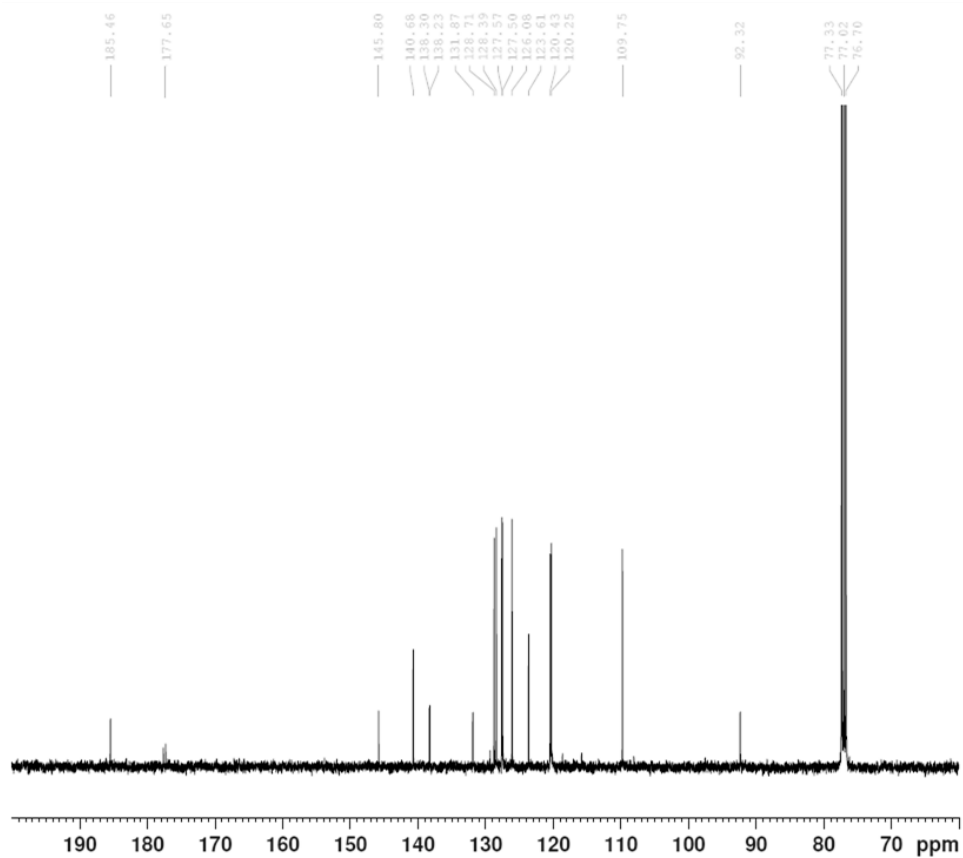


Fig. S2 ^{13}C NMR Spectrum of HL in CDCl_3 .

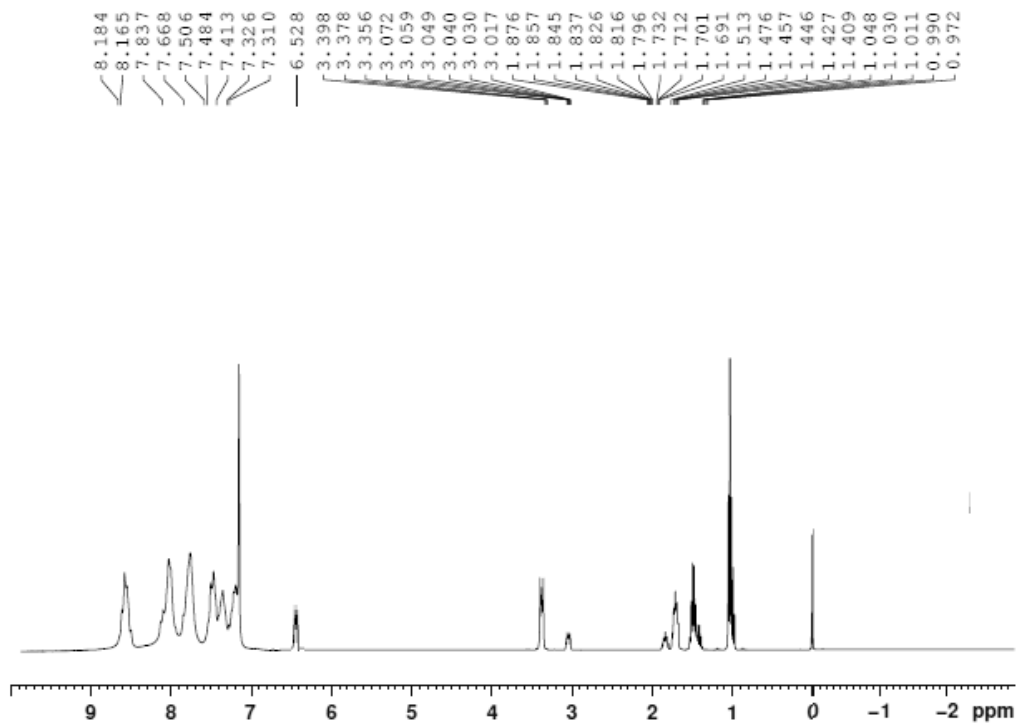
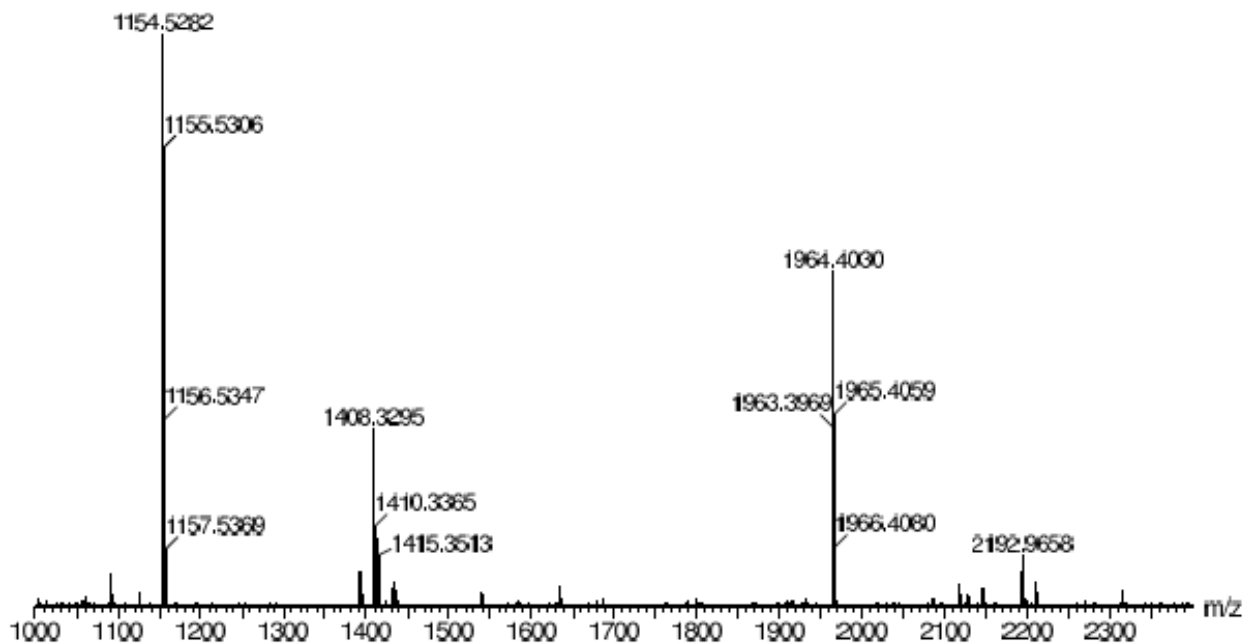
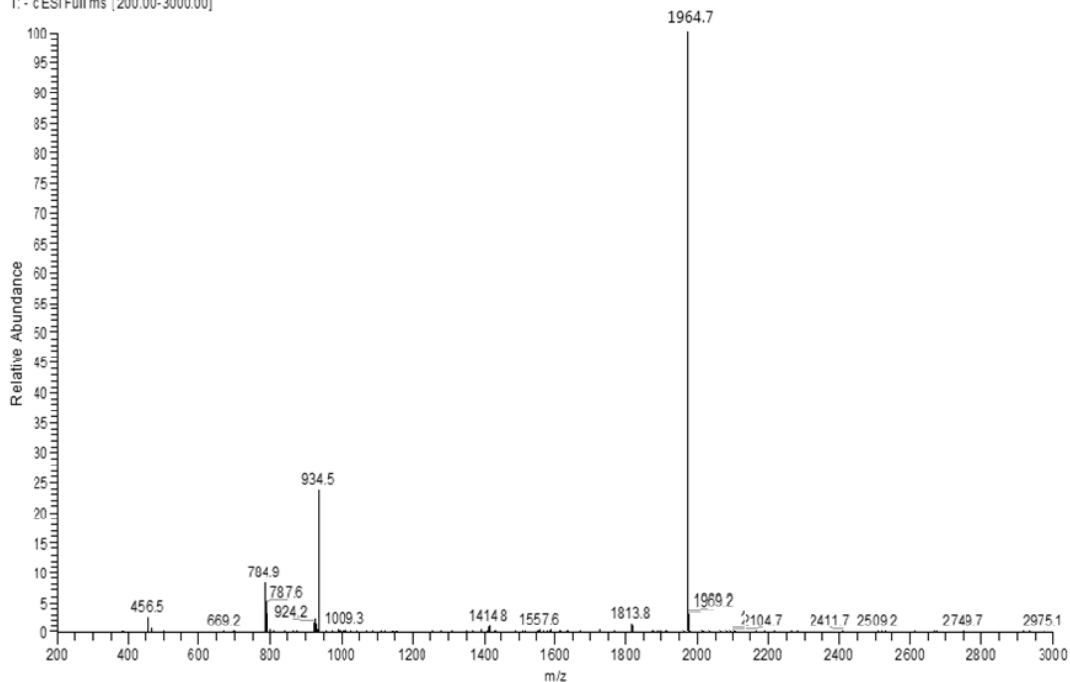


Fig. S3 ^1H NMR Spectrum of $\text{NBu}_4[\text{LaL}_4]$ in CDCl_3 .

Sb-LaL24 # 53 RT. 2.60 AV.1 NL : 2.38E5

T: - cESI Full ms [200.00-3000.00]



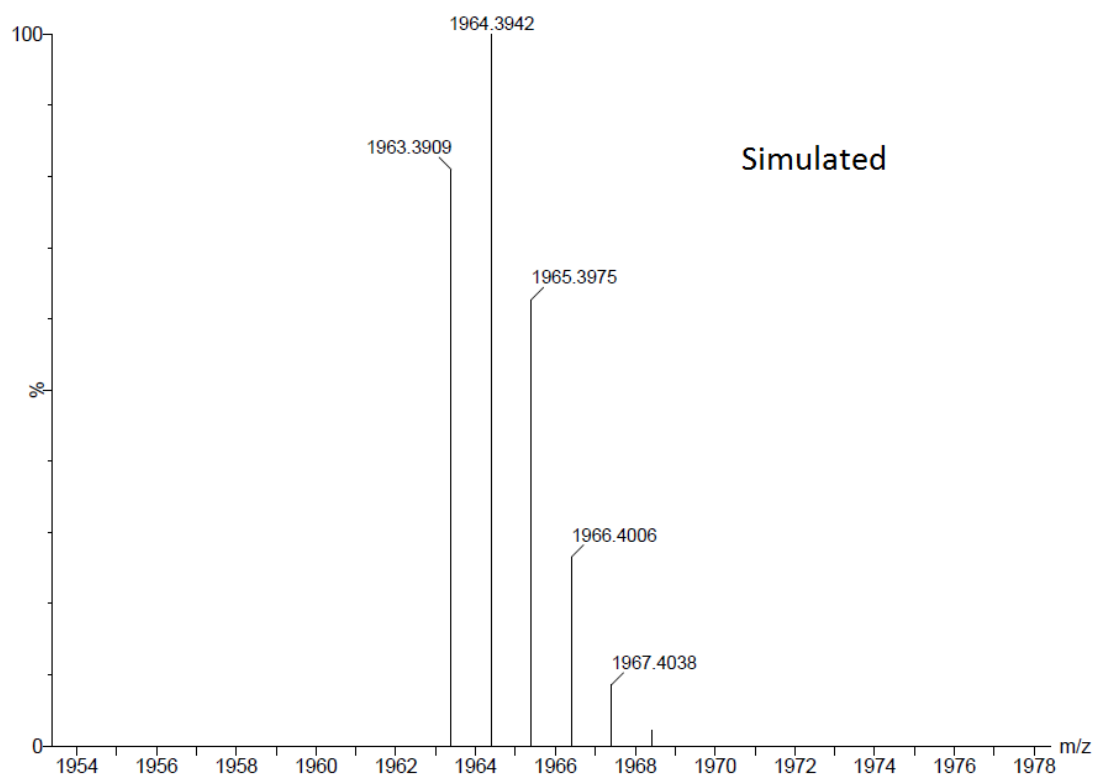
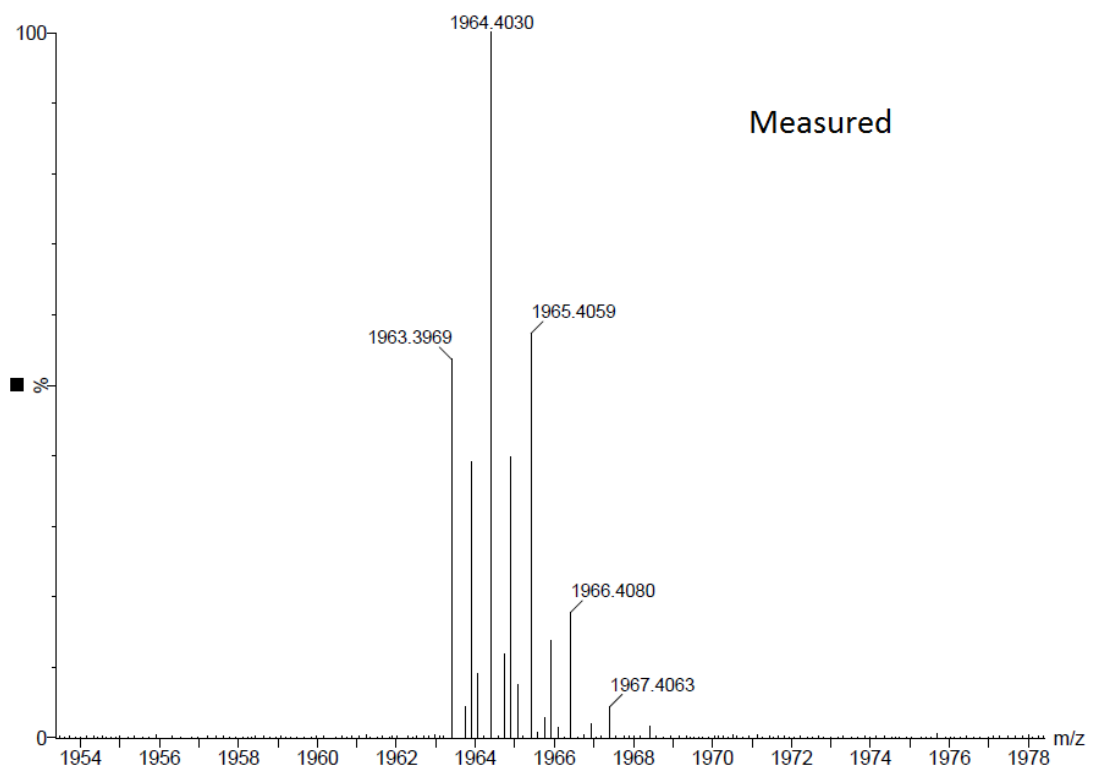
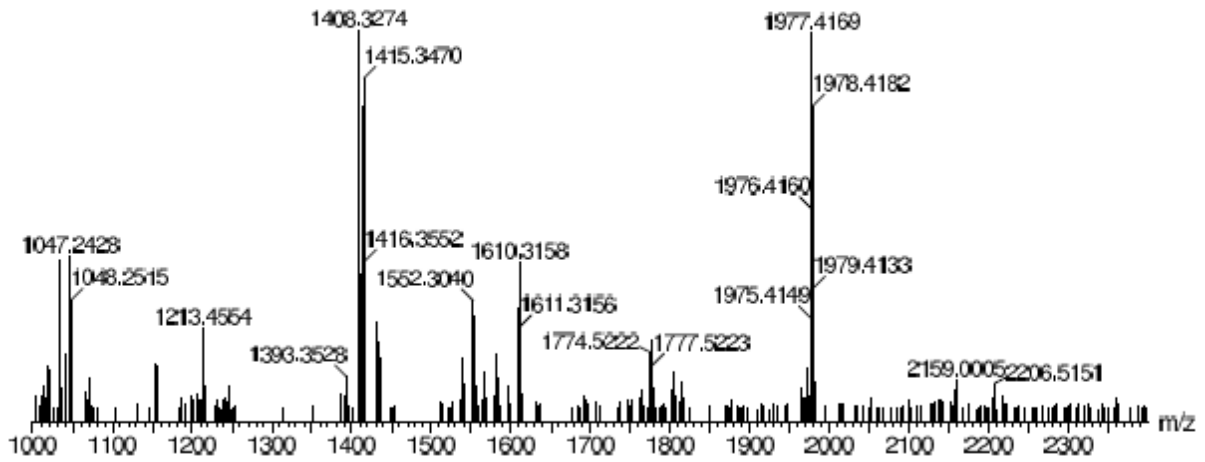
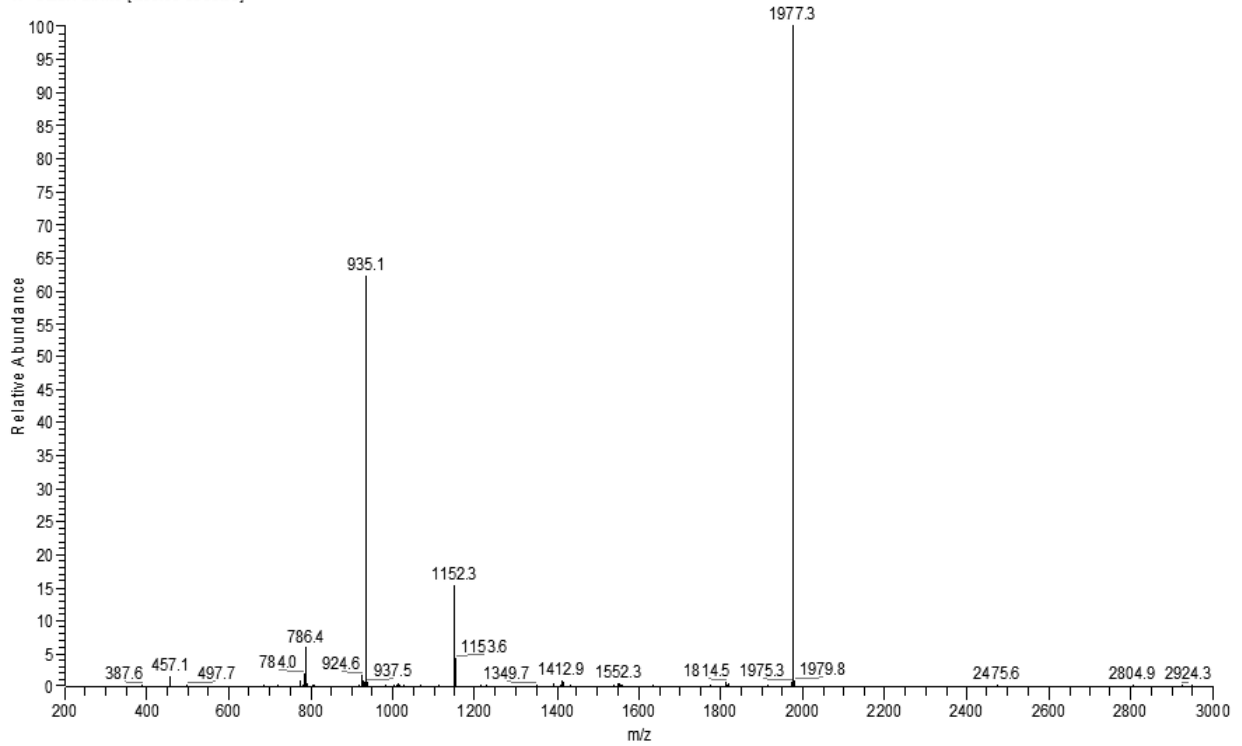


Fig. S4 Low and high resolution ESI mass spectra of $\text{NBu}_4[\text{LaL}_4]$ with isotopic patterns.

Sb-EuL24 #34 RT: 1.56 AV: 1 NL: 2.91E5
T: - c ESI Full ms [200.00-3000.00]



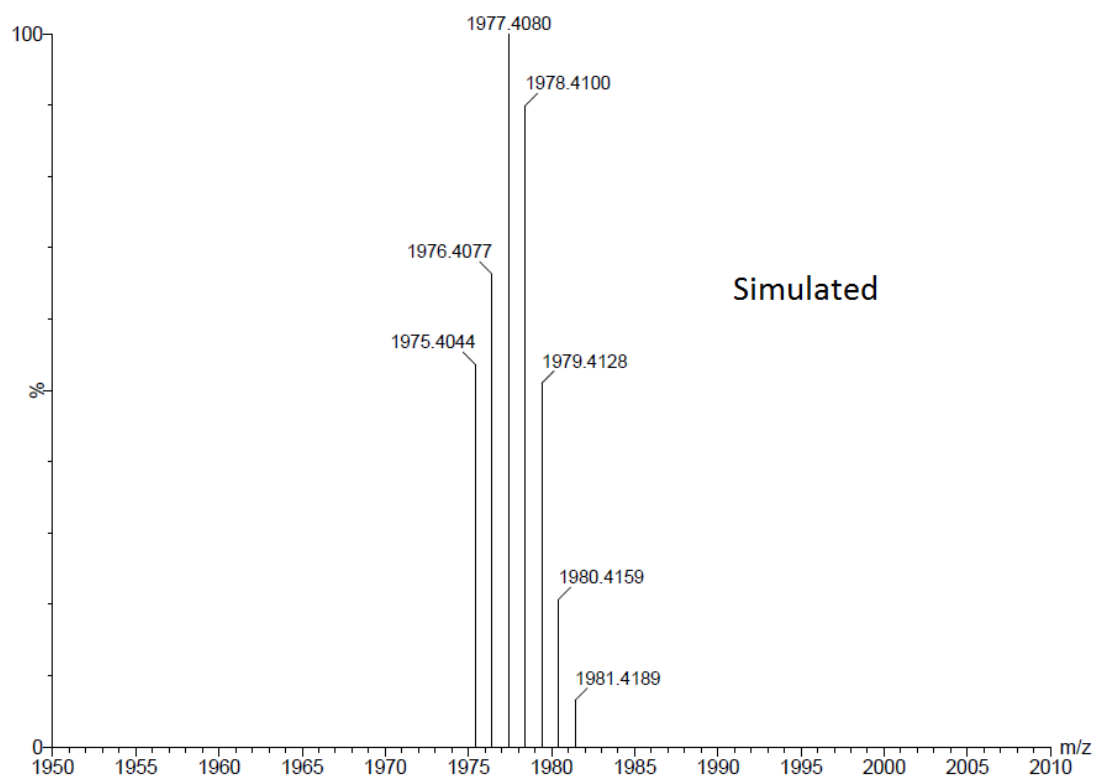
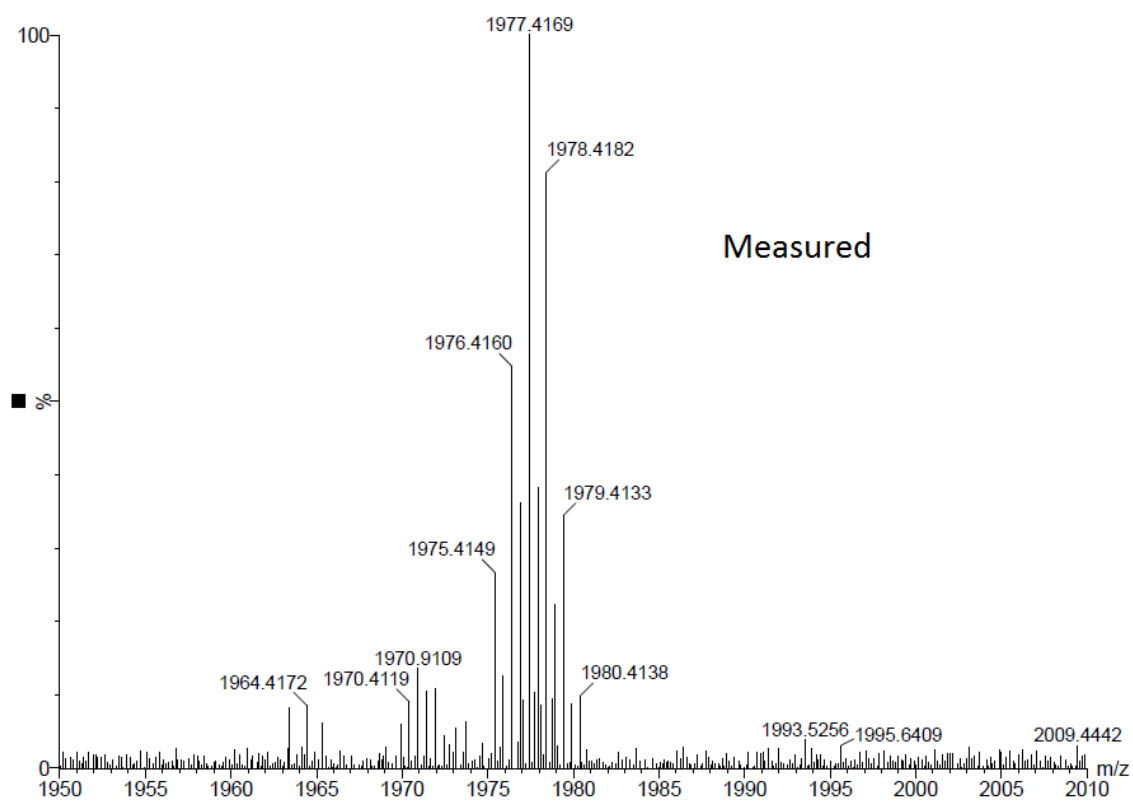


Fig. S5 Low and high resolution ESI mass spectra of $\text{NBu}_4[\text{EuL}_4]$ with isotopic patterns.

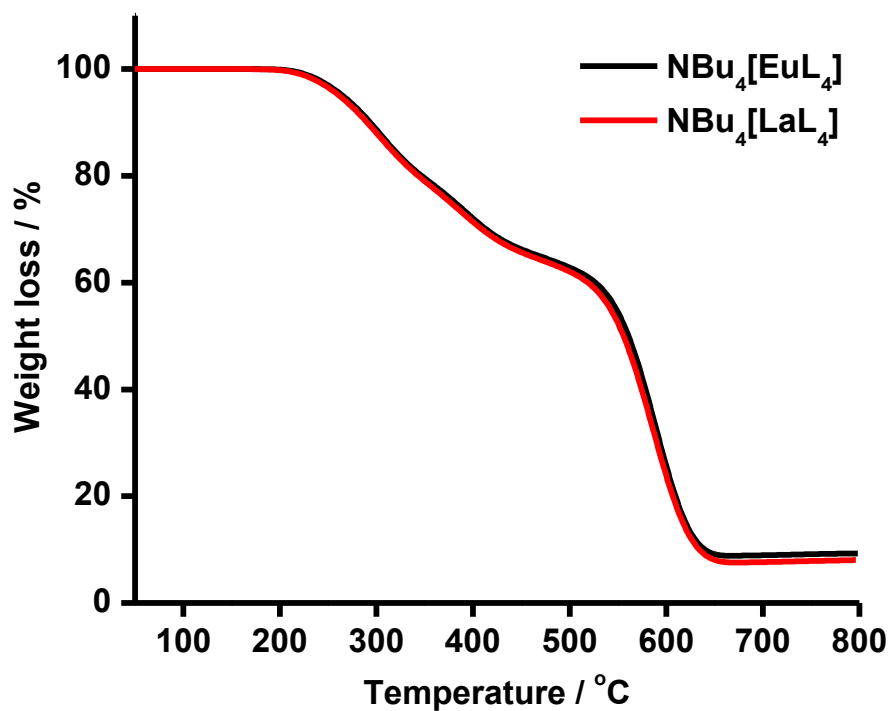


Fig. S6 Thermogravimetric curves of La^{III} and Eu^{III} complexes.

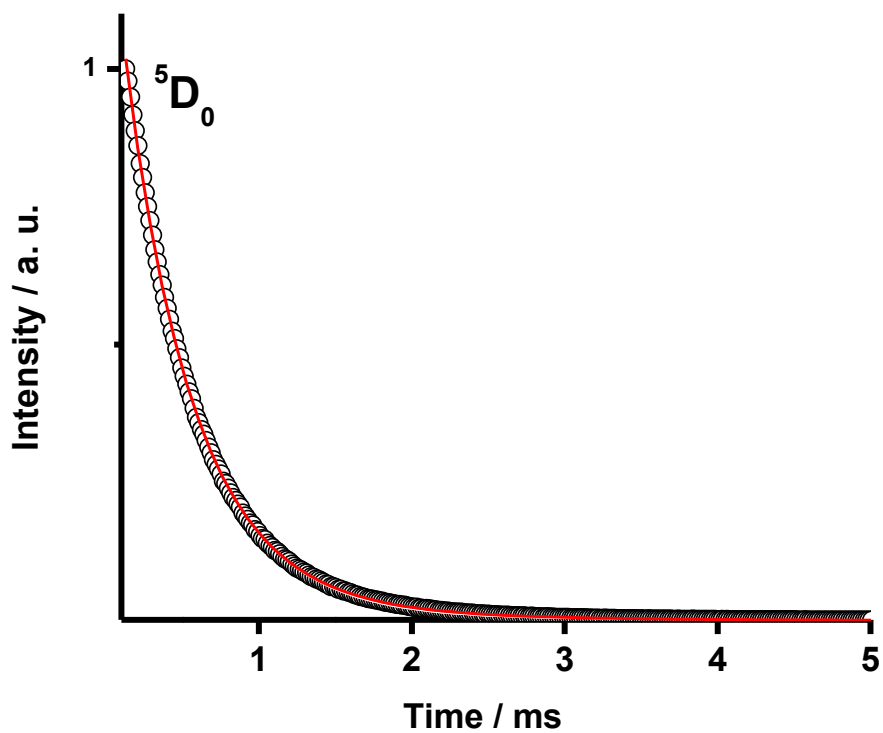
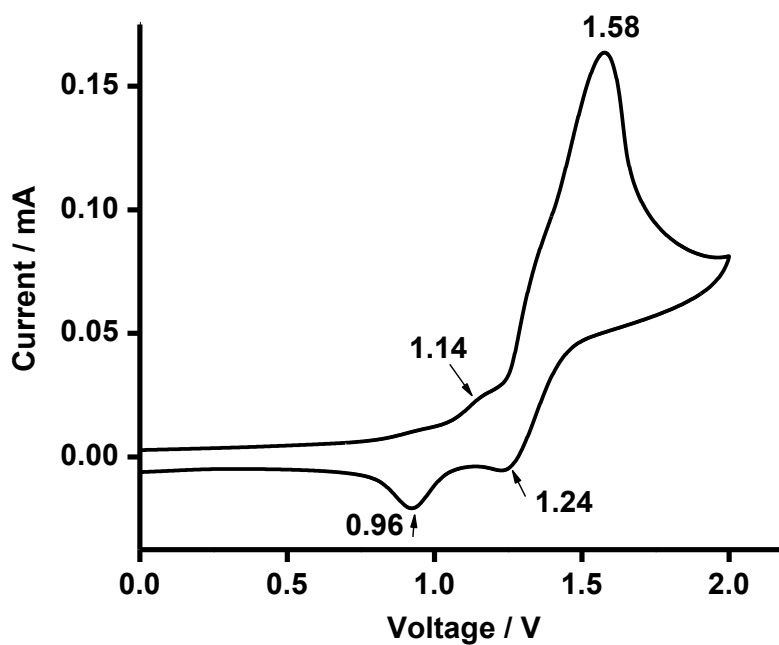


Fig. S7 $^5\text{D}_0$ decay profile of $\text{NBu}_4[\text{EuL}_4]$ at 298 K in solid state ($\lambda_{\text{ex}} = 400$ nm), monitored at 612 nm.



Complex	$E_{1/2}^{ox}(V)$	E_g (eV) ^a	HOMO	LUMO
NBu ₄ [EuL ₄]	1.05	-3.12	-5.82	-2.70

^aObtained from UV-Vis absorption spectrum

Fig. S8 Plot of cyclic voltammogram and HOMO, LUMO values of NBu₄[EuL₄].

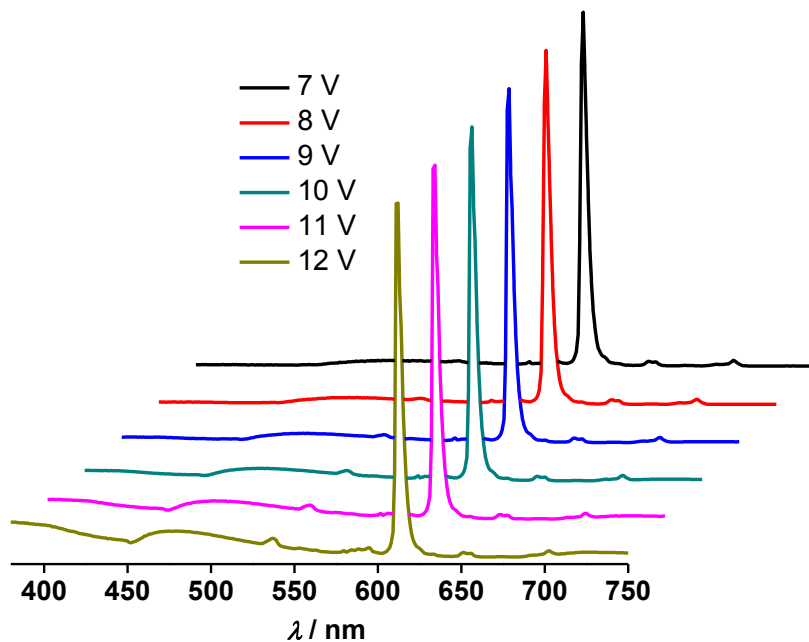


Fig. S9 Electroluminescence spectra of the device ITO/PEDOT : PSS (50 nm) / NBu₄[EuL₄] (30%): CBP (49%)-OXD7 (21%) (50 nm)/TPBI (50 nm)/LiF (1.5 nm)/Al (120 nm) at different voltages.

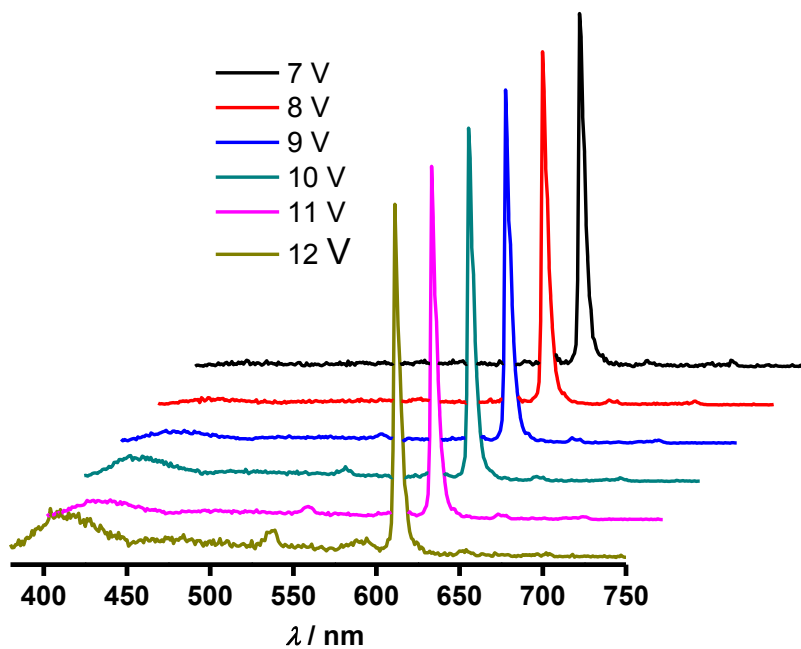


Fig. S10 Electroluminescence spectra of the device ITO/PEDOT: PSS (50 nm)/ NBu₄ [EuL₄] (50%): CBP (35%)-OXD7 (15%) (50 nm)/TPBI (50 nm)/LiF (1.5 nm)/Al (120 nm) at different voltages.

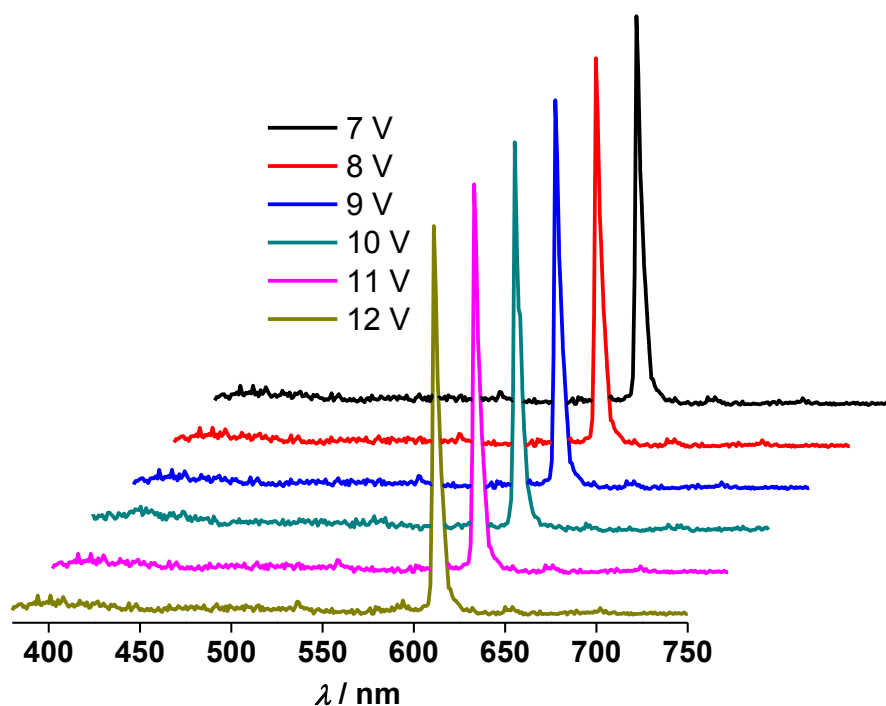


Fig. S11 Electroluminescence spectra of the device ITO/PEDOT: PSS (50 nm)/NBu₄[EuL₄] (50 nm)/TPBI(50 nm)/LiF(1.5 nm)/Al(120 nm) diode at different voltages.

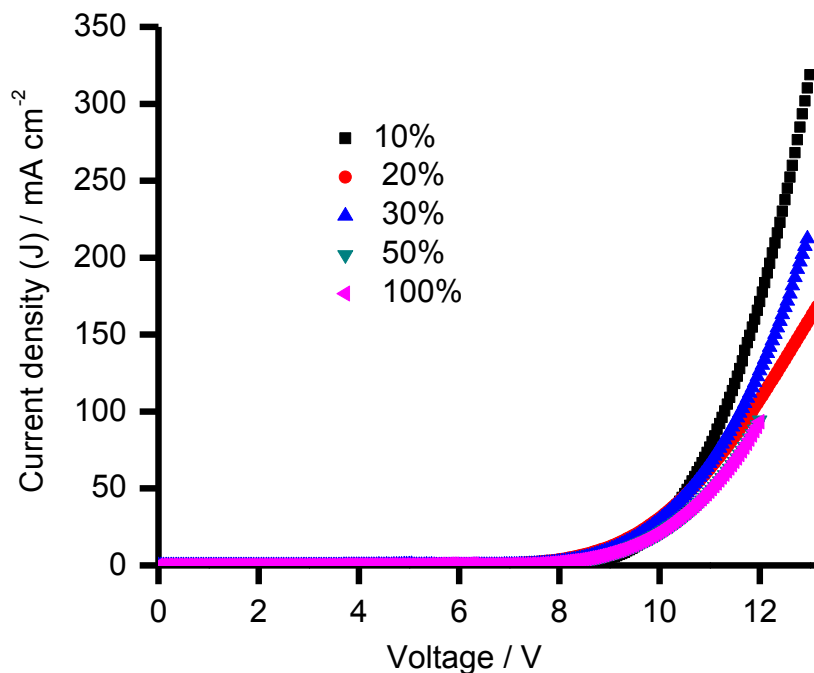


Fig. S12 Voltage (V)–Current density (*J*) characteristics of the device ITO/PEDOT: PSS(50nm)/NBu₄ [EuL₄] (10-20%): CBP (70%) - OXD7 (30%) (50 nm)/TPBI (50 nm)/LiF (1.5 nm)/Al (120 nm).

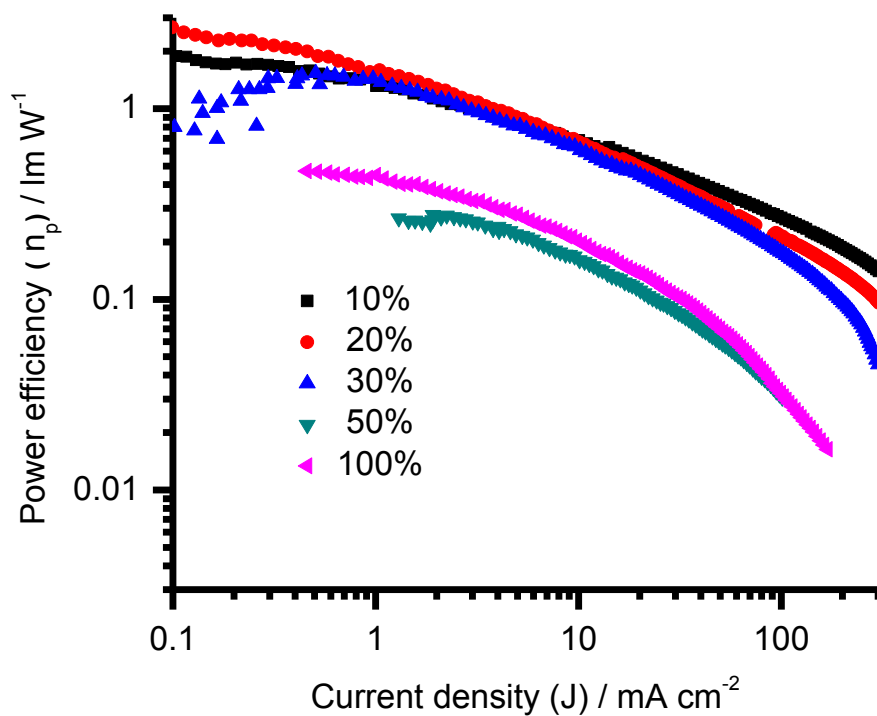


Fig. S13 Current density (J) versus power efficiency (η_c) of the devices ITO/PEDOT: PSS(50 nm)/NBu₄[EuL₄] : CBP-OXD7 (50 nm)/TPBI (50 nm)/LiF (1.5 nm)/Al (120 nm) with the doping percentage of Eu complex being 10%, 20%, 30%, 50%, and 100%, respectively. The weight ratio of mixed host CBP : OXD7 is 7 : 3.