

Electronic Supplementary Information

Visible-Blind Ultraviolet Narrowband Photomultiplication-Type Organic Photodetector with an Ultrahigh External Quantum Efficiency over 1000000%

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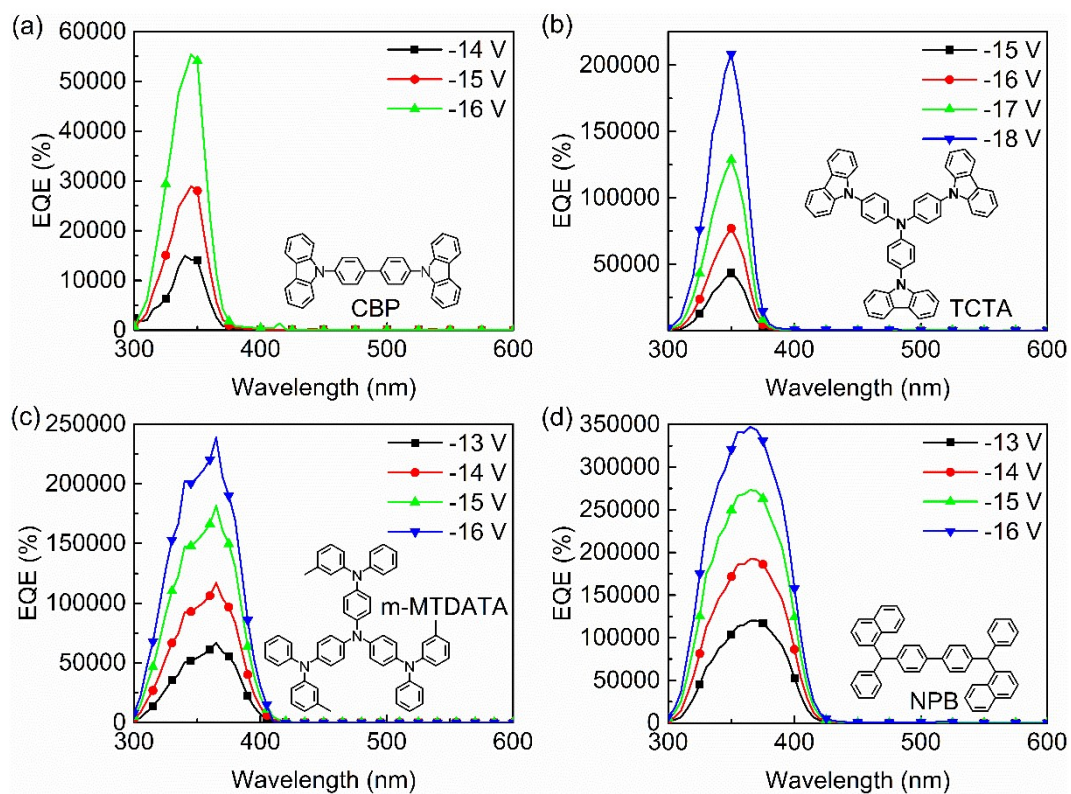


Figure S1. EQE spectral response characteristics of the fabricated UV PM-type OPDs with different active materials. (a) CBP, (b) TCTA, (c) m-MTDATA, (d) NPB

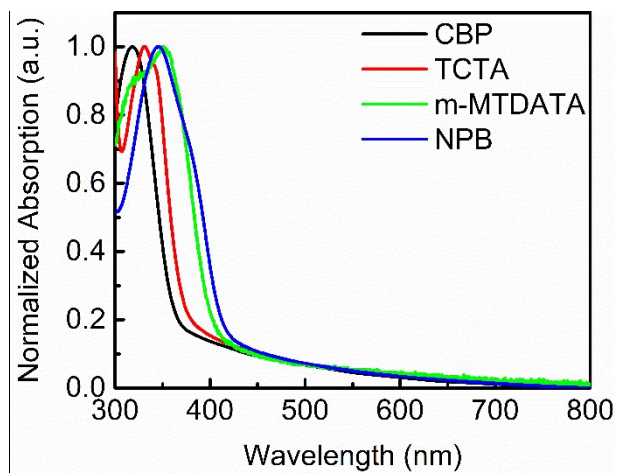


Figure S2. Normalized absorption spectra of CBP, TCTA, m-MTDATA, and NPB film.

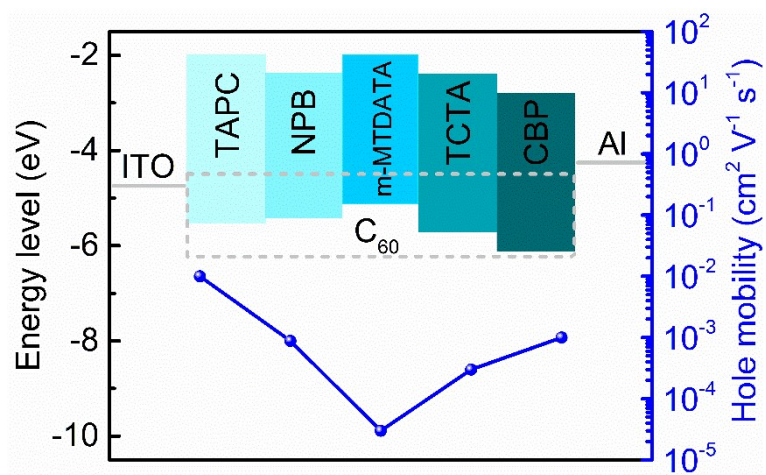


Figure S3. Energy level and hole mobility statistics of wide bandgap organic semiconductor materials.

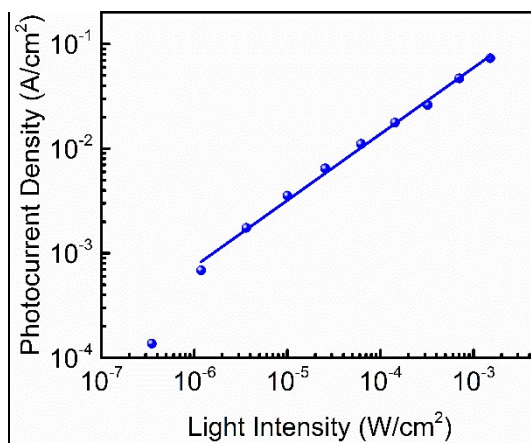


Figure S4. Incident light intensity-photocurrent density of the fabricated UV PM-type OPDs under -14 V bias voltage.

Chemical structures of the organic materials used in OLEDs and energy level of OLEDs are shown in **Figure S5a** and **Figure S5b**. The device efficiencies versus luminance characteristics, EL spectra at a luminance of 1000 cd/m², and current density-luminance-voltage characteristics are depicted in **Figure S5c** and **Figure S5d**. The maximum current efficiency (*CE*) and power efficiency (*PE*) reach 83.3 cd/A and 89.2 lm/W, respectively. The turn-on (*V_{on}*) voltage of resulting OLEDs is about 2.6 V.

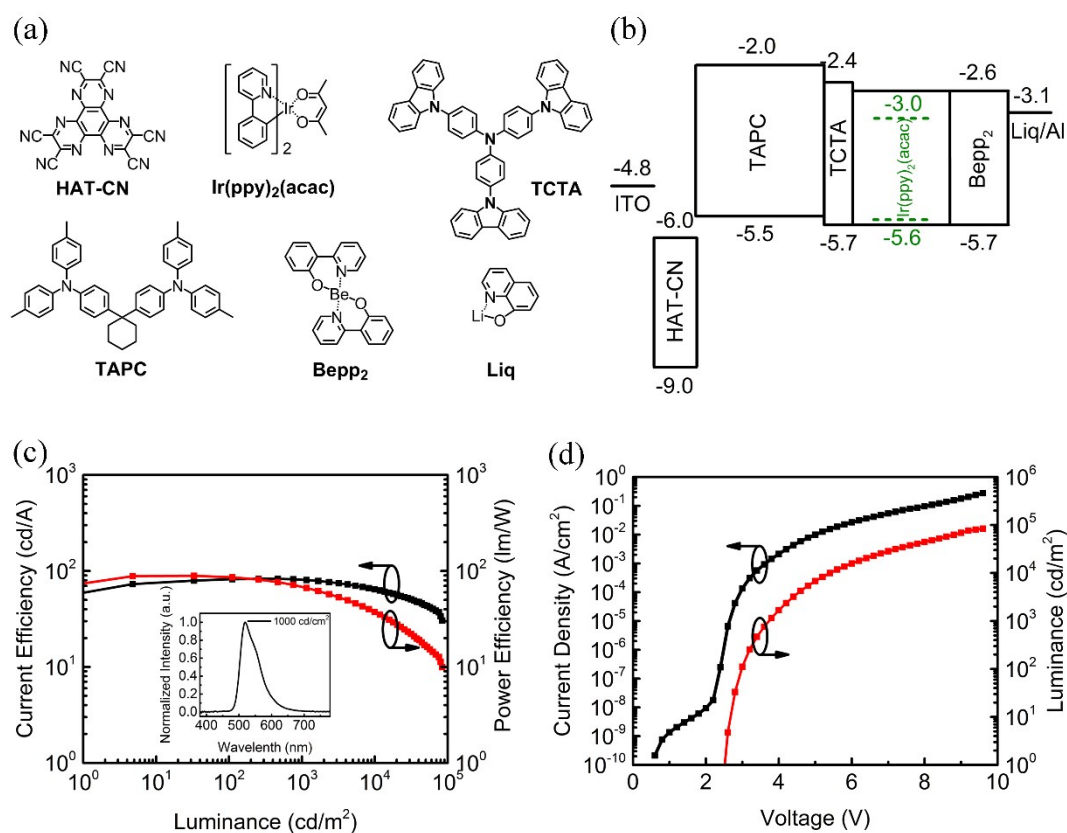


Figure S5. (a) The chemical structure of organic materials used in OLEDs. (b) The energy level diagram of OLEDs. (c) Current efficiency and power efficiency versus luminance characteristics of OLEDs. Insert: EL spectra of OLEDs at a luminance of 1000 cd/m². (d) Current density and luminance versus driving voltage characteristics of OLEDs.

Table S1 Performance comparison of the typical UV photodetectors.

Materials	Wavelength (nm)	R (A/W)	D* (Jones)	Response time	Reference
PVK:ZnO	360	721	3.4×10^{15}	-	1
NiO/ZnO	350	10.2	4.66×10^{12}	200 ms	2
MCP:TiO ₂	351	240	3.72×10^{14}	21 ms	3
Graphene ZnO	340	36	1.3×10^{12}	-	4
PFE:BNDI: ZnO	365	0.65	1.12×10^{14}	-	5
PDHF/TiO ₂	280	514.8	1.86×10^{13}	420 ms	6
BFE:ZnO	350	-	1.27×10^{13}	11 ms	7
PTAA:ZnO	350	83.2	1.6×10^{12}	-	8
F8T2:ZnO	360	6.39	8.8×10^{11}	16.4 ms	9
CsPbCl ₃	365	2.27	1.4×10^{13}	46 μ s	10
ZnO/PCDTBT	330	499	1.74×10^{14}	230 ms	11
Au/ZnO	365	2.6	8.18×10^{11}	4 ms	12
MAPbCl ₃	350	0.12	6×10^{12}	15 ns	13
TAPC:C ₆₀	335	2913	1.28×10^{14}	390 ms	Present work

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