



A Summary of Thermally Activated Delayed Fluorescence (TADF) OLEDs

Researchers from Kyushu University that led by Chihaya Adachi developed one kind of new OLED light-emitting fluorescent materials with 100% internal quantum efficiency. They have established light emission principle called thermally activated delayed fluorescence (TDAF) and worked on designing a material to increase its luminous efficiency.

Now, there are more teams put their effort in this area, as well as more references published and materials used. We can expect that will be great development in the future.

We summarize the literatures in recent years to understand TADF OLEDs development, the performance data below for your reference.

Short Name	Color	PL(nm)	CIE(x,y)	ΔE_{ST} (eV)	Max EQE(%)	Max current efficiency (cd/A)	Max power efficiency (lm/W)	Reference
2PXZ-TAZ	Blue	462	0.16,0.15	0.86	6.4	-	-	J. Mater. Chem. C, 2013, 1,4599
2CzPN	Sky-blue	473 (toluene)	-	-	8	-	-	Nature, 492, 234–238 (2012)
m-ATP-ACR	Sky-blue	483 (film)	-	0.13	8.7	13.1	6.2	Sci. Technol. Adv. Mater. 15 (2014) 034202
CZ-PS	Blue	404 (toluene)	0.15,0.07	0.32	9.9	-	-	J. Am. Chem. Soc. 2012, 134, 14706–14709
ACRFLCN	Blue-greenish	485 (film)	-	0.008	10.1	-	-	Angew. Chem. Int. Ed. 2012, 51, 11311–11315
PTZ-TRZ	Blue	409 (toluene)	-	0.18	10.8	-	-	J. Phys. Chem. C 2014, 118, 15985–15994
CC2TA	Sky-blue	435 (cyclohexane)	-	0.06	11	-	-	Applied Physics Letters 101, 093306 (2012)
CC2BP	Blue	475 (film)	0.17,0.27	0.14	14.3	25.5	-	Angew. Chem. 2014, 126, 6520–6524
DMAC-DPS	Blue	460 (toluene)	-	0.09	19.5	-	-	Nature Photonics 8, 326–332 (2014)
[Cu(pytfmpz)-(POP)]BF ₄	Blue-greenish	504 (film)	0.209,0.326	0.18	8.47	23.68	-	Chem. Mater. 2013, 25, 3910–3920
DPAA-AF	Blue-greenish	499 (film)	-	0.021	9.6	-	-	Chem. Lett. 2014, 43, 1017–1019
PIC-TRZ2	Blue-greenish	505 (film)	-	0.02	14	-	-	Phys. Rev. Lett. 110, 247401
ACRSA	Blue-greenish	490 (film)	-	0.04	16.5	-	-	Chem. Commun., 2013, 49, 10385
4CzIPN	Blue-greenish	507 (toluene)	-	0.01	19	-	-	Nature, 492, 234–238 (2012)
PXZ-TRZ	Green	529 (toluene)	0.34,0.57	0.07	12.5	-	-	Chem. Commun., 2012, 48, 11392–11394
HAP-3MF	Green	526 (film)	-	-	11.3	-	-	Chem. Commun., 2014, 50, 6174
m-ATP-PXZ	Green	524 (film)	-	0.04	12.6	34	24.3	Sci. Technol. Adv. Mater. 15 (2014) 034202
2PXZ-OXD	Green	502	0.58,0.45	0.57	14.9	-	-	J. Mater. Chem. C, 2013, 1,4599
4CzTPN	Green	535 (toluene)	-	0.06	17	-	-	Nature, 492, 234–238 (2012)
PXZ-DPS	Green	507 (toluene)	-	0.08	17.5	-	-	Nature Photonics 8, 326–332 (2014)
4CzPN	Green	525 (toluene)	-	0.12	18	-	-	Nature, 492, 234–238 (2012)
4CzTPN-Me	Yellow	561 (toluene)	-	-	-	-	-	Nature, 492, 234–238 (2012)
Spiro-CN	Yellow	540 (film)	-	0.025	4.4	13.5	13	Chem. Commun., 2012, 48, 9580–9582
4CzTPN-Ph	Red	577 (toluene)	-	-	11.2	-	-	Nature, 492, 234–238 (2012)
HAP-3TPA	Orange-red	610	0.60,0.40	0.17	17.5	25.9	22.1	Adv. Mater. 2013, 25, 3319–3323