Lumtec Luminescence Technology Corp.

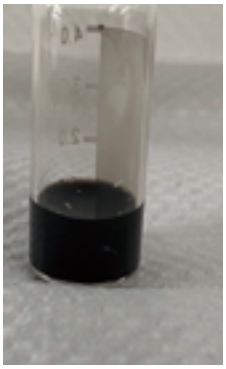
NiOx / SAM

for High-efficiency and Long-life Perovskite solar cell.

Nickel oxide nanoparticle has relatively good stability. In recent years, some Science papers have shown that NiOx is used in combination with self-assembled mono-molecular material (SAM) as hole-transporting layer. Through interface modification, the performance of perovskite solar device is improved. Power conversion efficiency and operating life have been significantly improved.

Cited Paper	Perovskite Device Structure	Efficiency & Life
Science, 382 (2023) 1399-1404.	FTO/NiOx/Me-4PACz/FAPbI3/PCBM/ SnO2/Cu	**PCE = 25.2 %** @0.074 cm^2 **Operation 1000hrs = 85.4%** @1 Sun, 50 °C PCE = 21 % @14.65 cm^2
Science, 382 (2023) 284-289.	ITO/NiOx/MeO-4PADBC/ perovskite/CF3-PEAI:MAI /C60/ BCP/Ag	**PCE = 25.6 %** @0.0414 cm^2 **Operation 1200hrs > 90%** @1 Sun, 65 °C

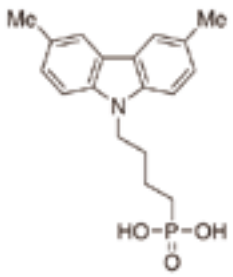
NiOx

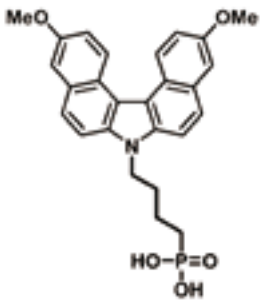


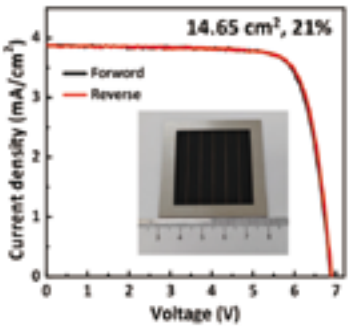
Item	NiOx Solution
Color	Black
Concentration	5 mg/mL
Solvent	H2O:IPA = 3: 1 (v/v)
pH	~10

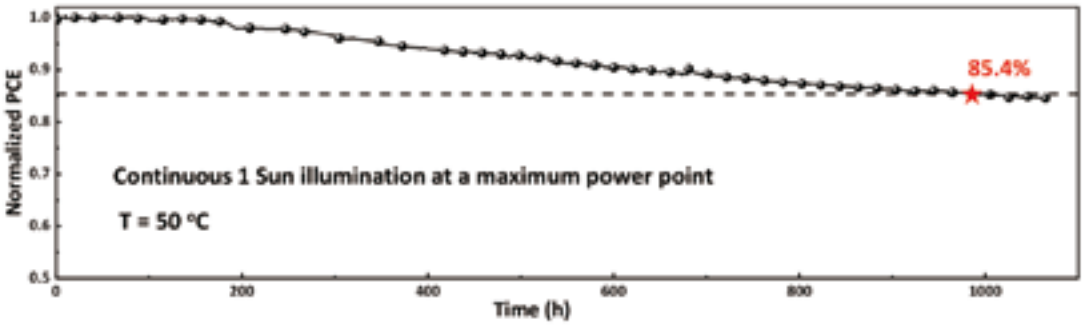
SAM

Me-4PACz (LT-S9557)	MeO-4PADBC





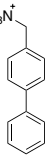




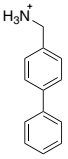
OPV

Perovskite Precursors

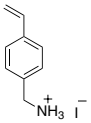
LT-S9833 BPMAI
>99%



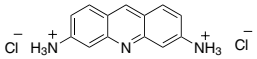
LT-S9834 BPMACl
>99%



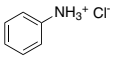
LT-S9846 VBAI
[2387694-61-1], >99%



LT-S9858
[531-73-7], >99%

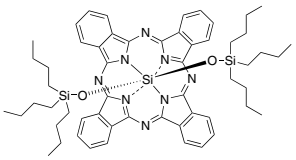


LT-S9865
[142-04-1], >99%

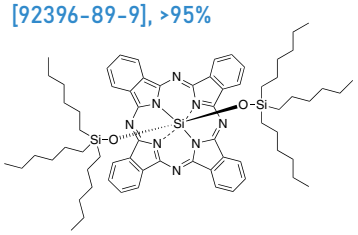


Small Molecules / Oligomer Materials

LT-S9847 3BS-SiPc
>95%



LT-S9849 3HS-SiPc
[92396-89-9], >95%



LT-S9850 3PS-SiPc
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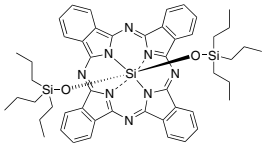
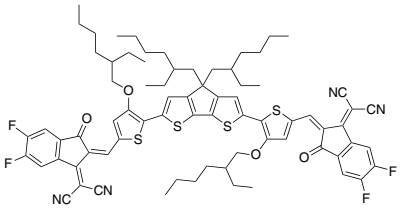
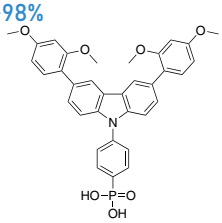


LT-S9868 COTIC-4F
>99%(NMR)

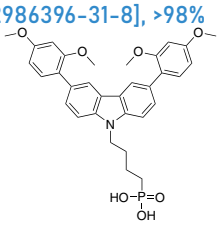


Self-Assembled Monolayer Materials

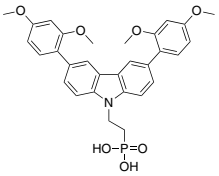
LT-S9842
>98%



LT-S9843
[2986396-31-8], >98%



LT-S9844
[2986396-25-0], >98%



LT-S9851 Cl-3PACz
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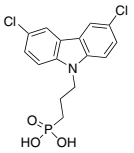

LT-S9852 Cl-4PACz
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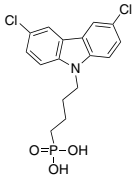

LT-S9855 I-3PACz
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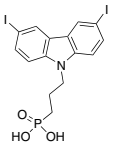

LT-S9856 I-4PACz
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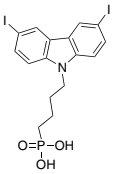

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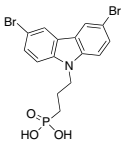
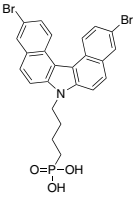


LT-S9859 Br-4PADBC
>98%



LT-S9860 CbzBF
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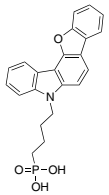

LT-S9861 CbzBT
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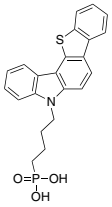

LT-S9862 MeO-4PADBC
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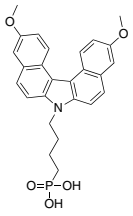
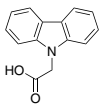
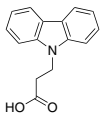


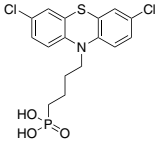
LT-S9863 9CAA
[524-80-1], >98%



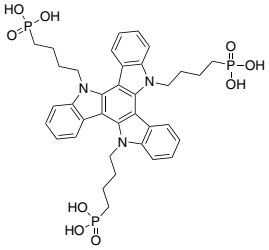
LT-S9864 9CPA
[6622-54-4], >98%



LT-S9867 TDPA-Cl
>98%



LT-S9869 3PATAT-C4
>98%



LT-S9870 2FMPA-BT-CA
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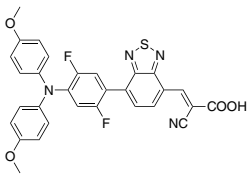
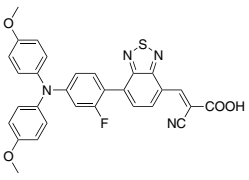


LT-S9871 FMPA-BT-CA
>98%



LT-S9872 EADR04
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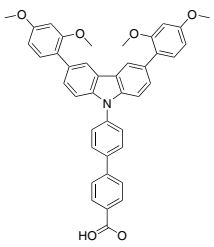

LT-S9873 PPAOMe
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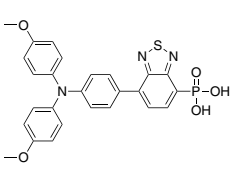

LT-S9874 PTZ-CPA
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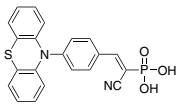

LT-S9875 MeO-6PACz
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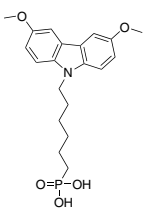

LT-S9876 tBu-4PACz
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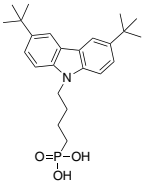
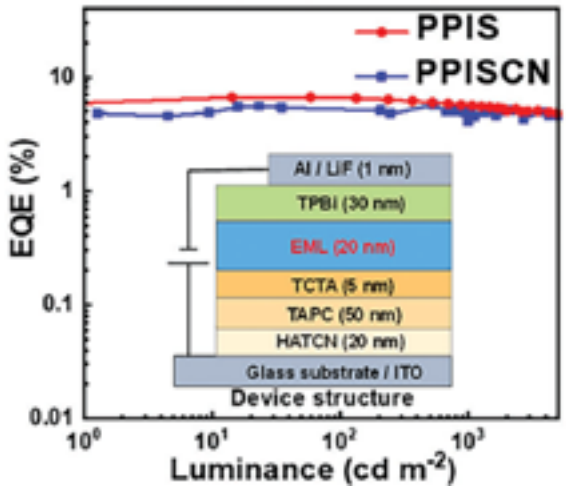


Hybridized Local and Charge-Transfer (HLCT) Molecule for OLED

High-efficiency deep-blue non-doped OLED and hybrid white OLED can be made by using a novel multifunctional HLCT host emitter PPIS (LT-N4252). The high luminance and reduced efficiency roll-off at high current density are achieved owing to higher charge mobility. The non-doped deep blue device shows EQE 6.68% at CIE(0.156, 0.090). Also, high EQE and PE exceeding 26.8% and 95 lm/W are realized without out-coupling for a two-color hybrid white OLED.



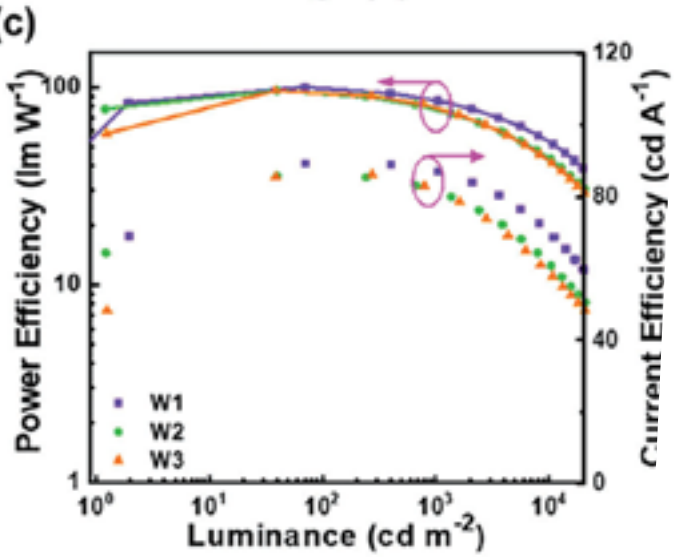
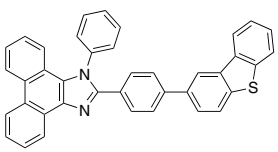


Table 2. EL performance of non-doped devices based on PPIS and PPISCN.

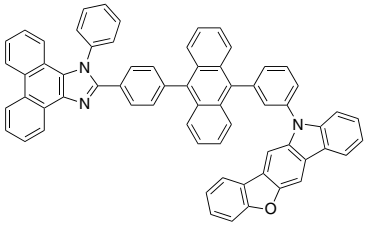
Devices	V_{on} [a] [V]	CE_{max} [b] [cd A^{-1}]	PE_{max} [b] [lm W^{-1}]	$EQE_{max/1000}$ [c] [%]	CIE (x, y) [d]
PPIS	2.9	5.08	5.45	6.68/5.61	(0.156, 0.090)
PPISCN	2.8	3.06	3.43	5.56/4.83	(0.157, 0.073)

Ref: DOI:10.1002/adom.202301413



LT-N4252
PPIS

CAS No.	:1621229-29-5
Grade	:Sublimed >99%
Formula	:C39H24N2S
M.W.	:552.69 g/mole
UV	:361 nm (in THF)
PL	:413 nm (in THF)
HOMO	:-5.68 eV
LUMO	:-2.33 eV



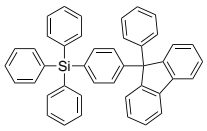
LT-N4254
PhAnMBf

CAS No.	:2962777-53-1
Grade	:Sublimed >99%
Formula	:C65H39N3O
M.W.	:878.02 g/mole
UV	:373, 393 nm (in THF)
PL	:436 nm (in THF)
HOMO	:-5.19 eV
LUMO	:-1.79 eV

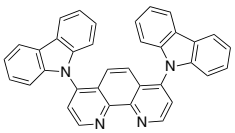
OLED

Phosphorescent Host

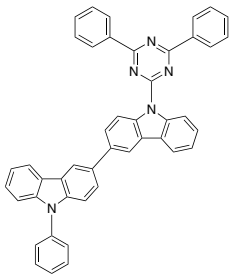
LT-N492 TPSi-F
[937082-80-9], >99%



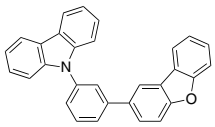
LT-N4001 BUPH1
[676542-82-8], Sublimed >99%



LT-N4043 CzT
[1266389-01-8], > 99%

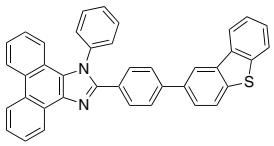


LT-N4061 CzDBF
[1338446-77-7], > 99%



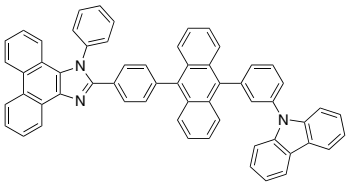
Phosphorescent Host

LT-N4252 PPIS
[1621229-29-5], Sublimed >99%



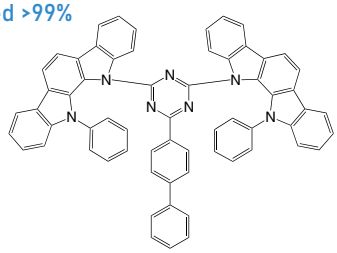
Fluorescent Host

LT-N4253 PAC
[2506256-67-1], Sublimed >99%



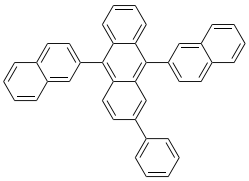
Host

LT-N4053 PIC-TRZ
Sublimed >99%

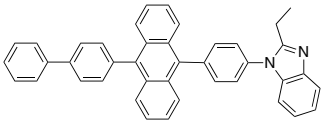


ETL-HBL

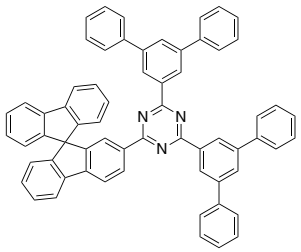
LT-N858 PhADN
[865435-20-7], Sublimed >99%



LT-N8025 ANT-BIZ
[1254961-38-0], Sublimed >99%

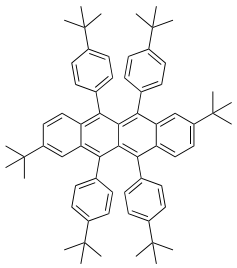


LT-N8026
[1233200-52-6], Sublimed >99%

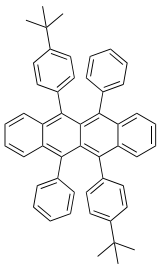


Red Dopant

LT-N7031
[850797-14-7], Sublimed >97%

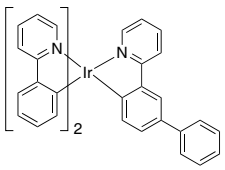


LT-N7032
[38066-71-6], Sublimed >97%

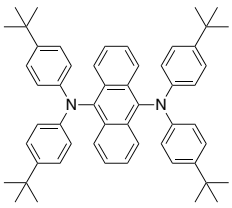


Green Dopant

LT-N513 Ir(ppy)2(m-bppy)
[1034145-18-0]
Sublimed > 99% (HPLC with Stereoisomer)

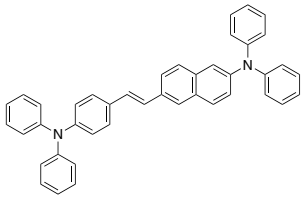


LT-N5017 tBuPAD
[756899-60-2], Sublimed >99%



Blue Dopant

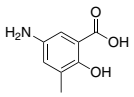
LT-N633 DPASN
[1093402-99-3], >99%



Synthetic Intermediates and Reagents

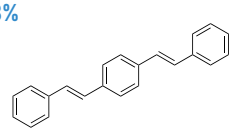
Arylamines

K1819
[6265-14-1], >95%



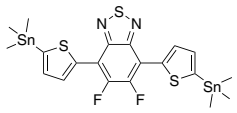
Benzene

K1817
[1608-41-9], >98%



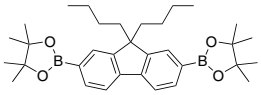
Thiophene

K1822
[1421762-30-2], >98%



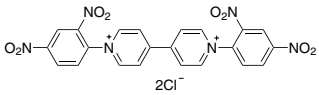
Boronic Acids / Boronic Esters

B1892
[355135-06-7], >97%

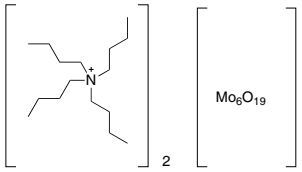


Other

K1821
[41168-79-0], >97%



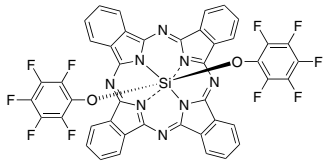
K1820



OTFT

Small Molecule

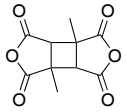
LT-S9848 F10-SiPc
>98%



PI

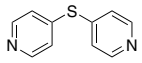
Dianhydrides

T0066 DMCBDA
[137820-87-2], >99%



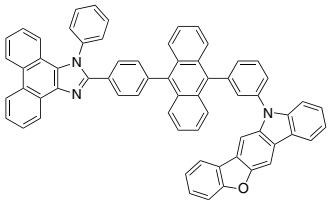
MOF

LT-MOF0463
[37968-97-1], >98%



AIE

LT-N4254 PhAnMBf
[2962777-53-1], Sublimed >99%



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