Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Triplet exciton recycling of phosphorescent emitter by up-conversion process using delayed fluorescent type low triplet energy host material

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Experimental section

General procedure

All purchased commercial reagents and solvents were used without further purification. Sodium hydride and dimethylformamide (DMF) were purchased from Sigma Aldrich. The ^{1}H NMR were recorded in $CDCl_3$ at JEOL 400 (400 MHz) spectrometer. LC(liquid chromatography)-MS spectrometry was carried out using Agilent Technology 6120 LC/MS spectrometer.

Synthesis of 9,9'-(5-(4,6-diphenyl-1,3,5-triazin-2-yl)-1,3-phenylene)bis(carbazole-3-carbonitrile), (DCzCNTrz)

2-(3,5-Difluorophenyl)-4,6-diphenyl-1,3,5-triazine (0.80 g, 2.29 mmol) and 9*H*-carbazole-3-carbonitrile (0.98 g, 5.05 mmol) were dissolved in DMF (30 ml) under a pure nitrogen atmosphere. Sodium hydride (0.37 g, 9.17 mmol) was dissolved in the mixture and the reaction mixture was stirred at 60 ℃ for 1day. The reaction mixture was filtered with methanol and distilled water. The white product was obtained in 0.81 g (51% yield) and 0.56 g of the product was further purified by sublimation.

^{1}H NMR (400 MH_Z,$CDCl_3$) : 9.13 (d, J=2.00 Hz, 2H), 8.73 (d, J=2.00 Hz, 2H), 8.53 (s, 2H), 8.27 (d, J=4.00 Hz, 2H), 7.92 (s, 2H), 7.78-7.44 (m, 15H) LC-MS *m/z* 688 [$(M)^+$]

List of figure

Figure S1. Synthesis scheme of 2-(3,5-difluorophenyl)-4,6-diphenyl-1,3,5-triazine and 9*H*-carbazole-

Figure S2. UV–vis absorption, room temperature PL and low temperature PL spectra of DCzTrz, TrzmPCz, DCzCNTrz.

Figure S3. Single carrier current density data of DCzTrz and mCP.

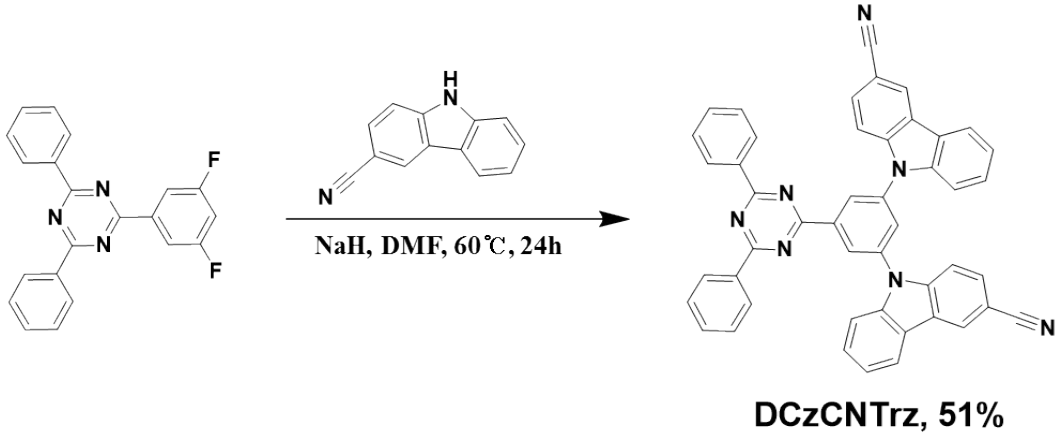

Figure S1.

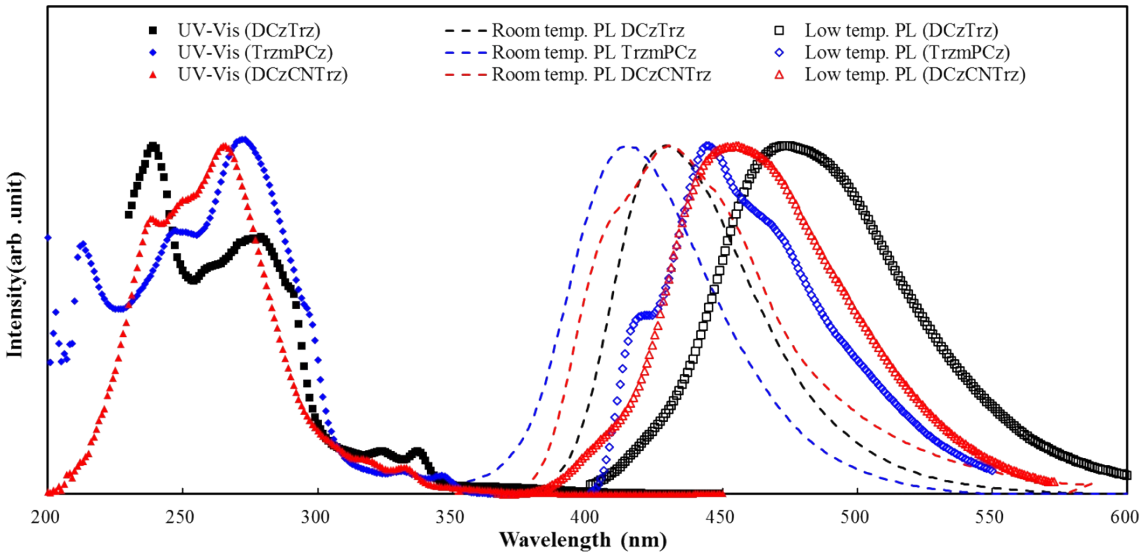
UV-Vis (DCzTrz)
UV-Vis (TrzmPCz)
UV-Vis (DCzCNTrz)
Room temp. PL DCzTrz
Room temp. PL TrzmPCz
Room temp. PL DCzCNTrz
Low temp. PL (DCzTrz)
Low temp. PL (TrzmPCz)
Low temp. PL (DCzCNTrz)
Intensity(arb .unit)
200
250
300
350
400
450
500
550
600
Wavelength (nm)

Figure S2.

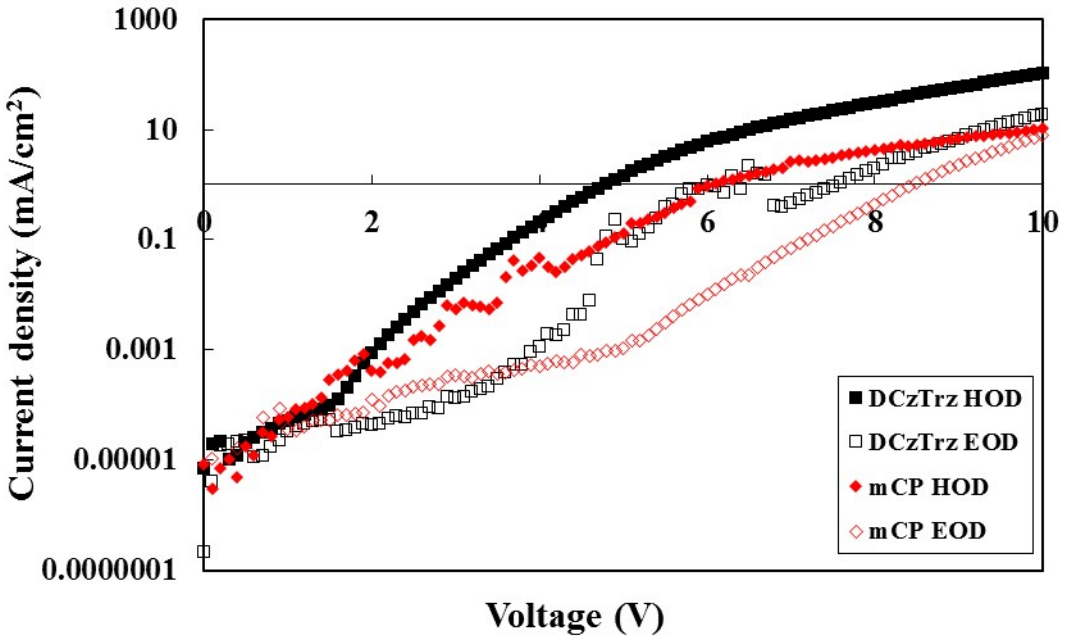
1000
10
0.1
0.001
0.00001
0.0000001
Current density (mA/cm²)
0
2
6
8
10
Voltage (V)
DCzTrz HOD
DCzTrz EOD
mCP HOD
mCP EOD

Figure S3.