Diarylamine-Substituted Pyrene derivatives for Blue OLEDs

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Organic light-emitting diodes (OLEDs) has developed in the display industry because of its potential in flat-panel displays and solid-state lighting.[1] To achieve full-color display, highly efficient blue emitter is important due to the low efficiencies compared to red and green emitters.[2] In this study, we synthesized a series of blue fluorescent materials based on diarlamine-substituted pyrene derivatives.[3] Among those, two materials (**1** and **2**) showed the deep-blue emissions.

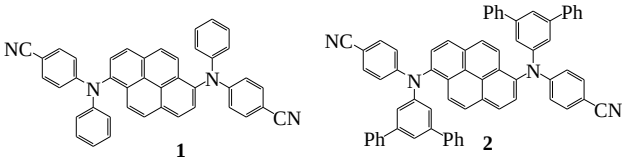

Fig. 1. Molecular Structures of Blue emitters 1-2.

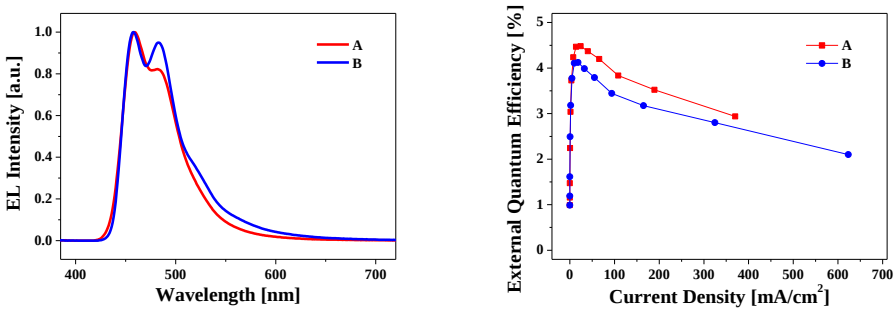

Fig. 2. EL spectra and external quantum efficiencies of device A−B.

To investigate the EL properties mof these two materials (**1** and **2**), OLED devices were fabricated in the following sequence; indium tin oxide (ITO) / 4,4′,4″-Tris[2-naphthyl(phenyl)amino]triphenylamine (2-TNATA) (60 nm) / *N*,*N*′-diphenyl-*N*,*N*′-(1-napthyl)-(1,1'-phenyl)-4,4'-diamine (NPB) (20 nm) / *α*,*β*-ADN: blue dopants (10%) (**1**–**2**) (30 nm) / 2-(4-(9,10-di(naphthalen-2-yl)anthracen-7-yl)phenyl)-1-phenyl-1H-benzo[*d*]imidazole (DNAB) (30 nm) / lithium quinolate (Liq):Al. Both devices showed blue emission with good efficiencies. In particular, a device using compound **1** exhibits good EL properties with luminous-, power, and external quantum efficiency of 5.92 cd/A, 2.56 lm/W, and 4.47% at 20 mA/cm^2 respectively, with CIE coordinates (0.14, 0.18) at 6.0 V.

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References

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