Fluorene Derivatives Containing Electron-Withdrawing Heteroaromatics for Blue OLED

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Organic light-emitting diodes (OLEDs) has attracted attentions as the next generation display since the pioneeing work done by Tang and co-workers.[1] To achieve full-color display, development of blue emitter is important due to the lower efficiencies than red and green emitters.[2] In this work, we synthesized a series of blue fluorescent materials (**1**-**3**) based of fluorene derivatives containing electron-withdrawing heteroaromatics.[3]

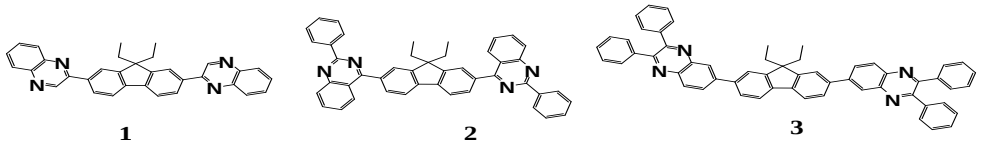

Figure 1. Molecular Structures of Blue emitters 1-3.

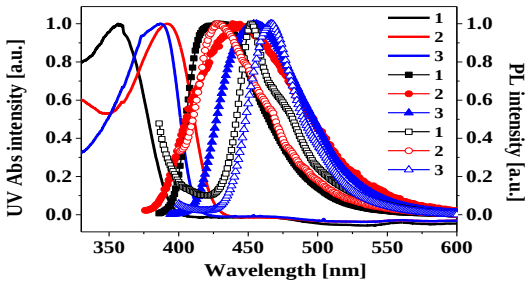

Fig. 2. UV-vis absorption spectra (no symbol), PL spectra in dichloromethane (closed symbol), and in thin films (opened symbol) of blue emitters 1−3.

Compounds **1**-**3** showed the blue emissions both in solution and solid states under the photo-excitation conditions, as shown in Figure 2. OLED devices using these materials were fabricated in the following sequence; indium tin oxide (ITO) (180 nm) / *N*,*N*′-diphenyl-*N*,*N*′-(1-napthyl)-(1,1'-phenyl)-4,4'-diamine (NPB) (20 nm) / emiting materials (30 nm) / bathophenanthroline (Bphen) (30 nm) / lithium quinolate (Liq) (2 nm) / Al (100 nm). All devices showed the blue emissions. In particular, a device using compound **2** exhibits good EL properties with luminous efficiency and power efficiency of 0.98 cd/A and 0.51 lm/W, at 20 mA/cm^2 respectively. The CIE coordinates of this device was (0.18, 0.24) at 6.0 V.

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References

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