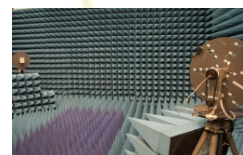
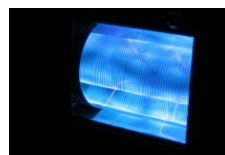
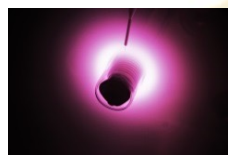
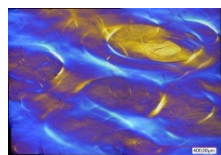


Use of 2,2'-di(*p*-tert-butylphenyl)-6,6'-bibenzoxazole (BBzx) in deep-blue organic light-emitting diodes (OLEDs)

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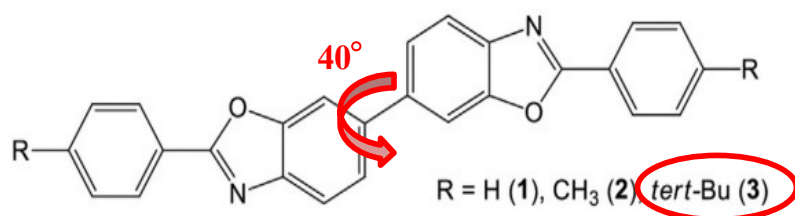
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Oxazole-based fluorophores, such as 2,2'-di(*p-tert*-butylphenyl)-6,6'-bibenzoxazole (BBzx) derivatives, show efficient emission in the UV and deep blue spectral range in the solid state. The incorporation of the bis-chromophore BBzx within organic light emitting diodes (OLED) as emissive layer leads to efficient emission. OLEDs displayed a deep blue emission at 430 nm arising from the BBzx layer, with CIE coordinate of (0.157, 0.044). These specific optical features were attributed to the twisted molecular structure of the bis-chromophore, leading to reduction of the aggregation induced fluorescence quenching. An EQE of 1.2% was achieved with a driving current of 24 A/m². The results suggest that BBzx derivatives may be useful as efficient color saturation deep-blue emitters in OLEDs.

Bis-benzoxazole: Twisted conformation

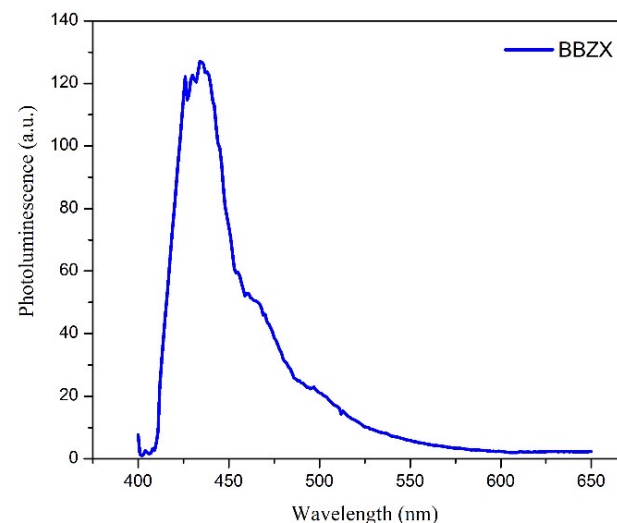
BBzx \Rightarrow Non Planar conformation



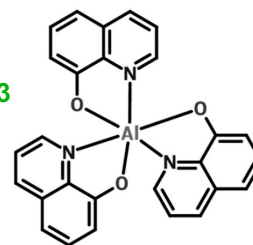
2,2'-di(*p-tert*-butylphenyl)-6,6'-bibenzoxazole (BBzx)

Non planar conformation disfavors close π - π stacking interactions, leading to efficient emission in thin film

PL (λ_{ex} =380 nm) spectra of a 20 nm thin BBzx film



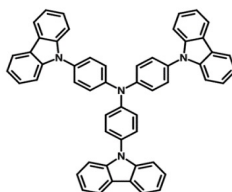
Electron transport layer/emission layer (ETL/EML): **Alq₃**
Tris(8-hydroxyquinoline)aluminum(III)



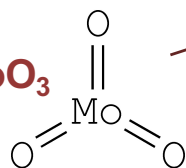
Calcium: **Ca**

Deep blue molecule: **BBzx**
2,2'-di(*p*-*tert*-butylphenyl)-6,6'-bibenzoxazole

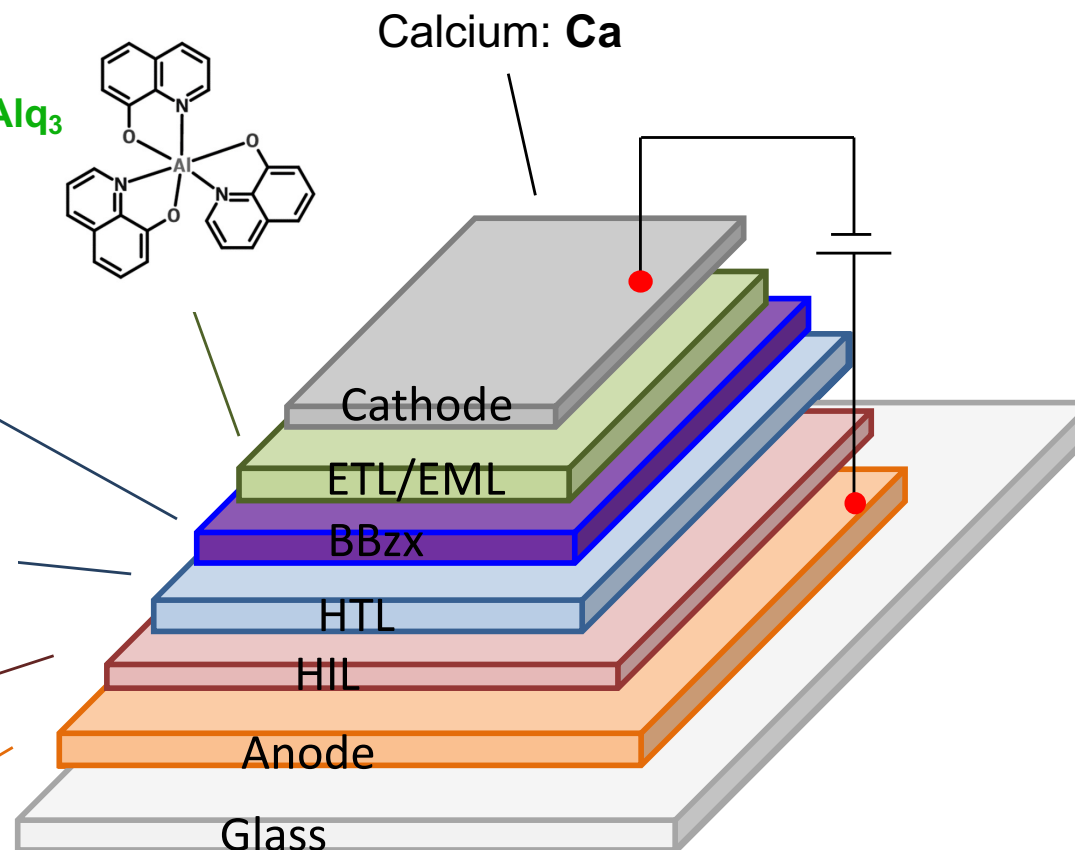
Hole transport layer (HTL): **NPD**
N,N'-Di(1-naphthyl)-N,N'-diphenyl-(1,1'-biphenyl)-4,4'-diamine



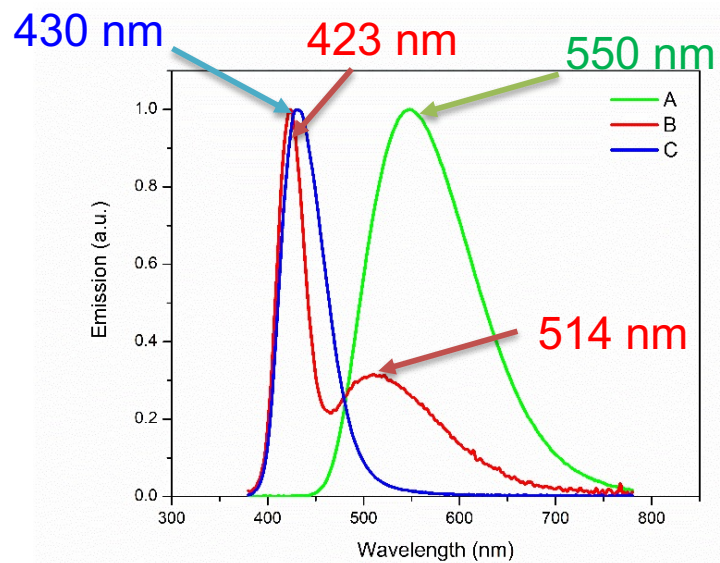
Hole injection layer (HIL) : **MoO₃**
Molybdenum(VI) oxide



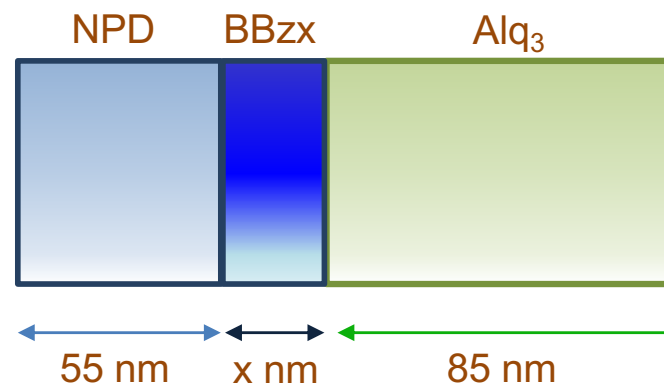
ITO indium tin oxide
100 nm, 15 Ω/square



OLED area: 18.28 mm²



Structure of B and C devices



OLED A:
Reference device

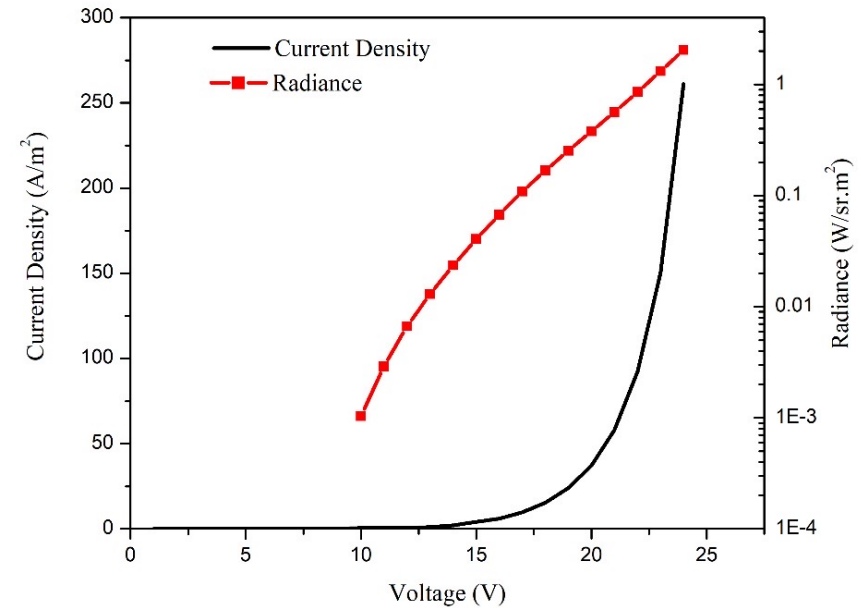
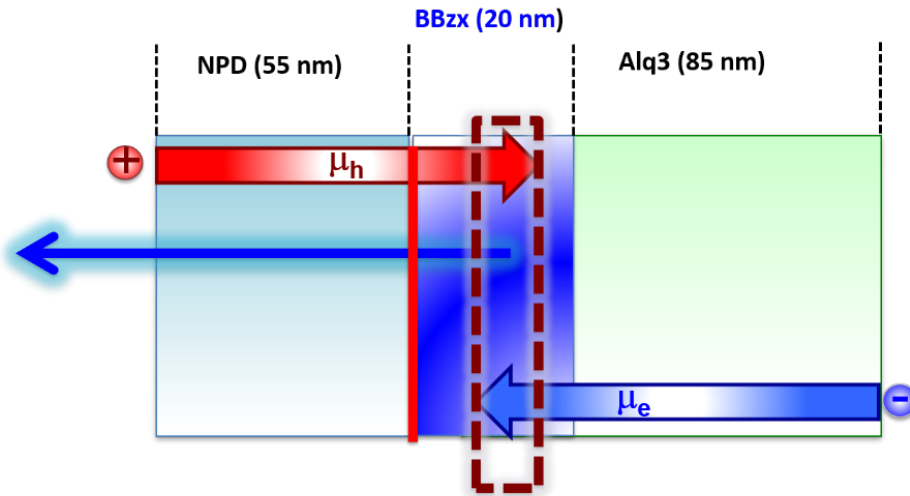
Variation the thickness of BBzx

Device B 10 nm

20 nm Device C

- ✓ Emission of Alq₃ and BBzx
- ✓ Shift of the recombination zone to the BBzx / Alq₃ interface

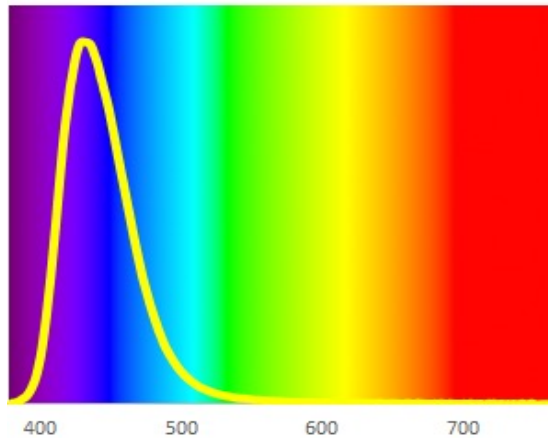
- ✓ Emission of BBzx
- ✓ recombination zone located in the BBzx layer



NDP (55nm) /BBzx (20 nm)/Alq₃ (85nm)

- ✓ Pure deep blue emission at 430 nm with CIE (0.15, 0.04)
- ✓ EQE= 1.2% at 24 A/m²
- ✓ Le= 2 W/sr.m² at 24V

- BBzx → Non Planar conformation → Reduction of aggregation induced fluorescence quenching in thin film
- The variation of DB-layer leads to the shift of emission zone from the BBzx/ Alq₃ interface to BBzx Layer



Deep blue emission at 430 nm
 CIE coordinate (0.15, 0.04)
 Le= 2 W/sr.m² at 24V
 EQE= 1.2% at 24 A/m²

