Supporting information

Color Tuning in Inverted Blue Light-Emitting Diodes Based on Polyfluorene Derivative by Adjusting the Thickness of Light-Emitting Layer


Fig. S1. Chemical structures of RGB light emitting polymers PF-FSO5(B), PPF-FSO10-BT2(G) and PPF-FSO25-DHTBT10(R).
**Fig.S2.** J-V-L and J-LE characteristics of IPLEDs (a,c) and CPLEDs (b,d) with the different emissive layer’s thickness of PF-FSO10.
Optical interference

Optical path is the product of the geometric distance which light go through medium and refractive index of that medium. Namely,

\[ L = nd \]

where \( L \): optical path, \( n \): refractive index of medium, \( d \): geometric distance.

Optical path difference \( \delta = n_2d_2 - n_1d_1 \),

\[ \delta = 2n_{PF \text{-} FSO10}d + 2n_{MoO3}d_{MoO3} + \frac{\Phi_m}{4\pi} \Phi_m = \arctan \left( \frac{2n_mk_m}{n_s^2 - n_m^2 - k_m^2} \right). \]

So, in the IPLED,

where \( n_s \) is the refractive index of the organic in contact with the metal, and \( n_m \) and \( k_m \) are the real and imaginary parts of the metal refractive index.\(^1\)

\[ \delta = \left\{ \begin{array}{ll} \pm k\lambda \quad & k = 0, 2, \ldots \quad (a) \\ \pm (2k + 1)\frac{\lambda}{2} \quad & k = 1, 2, \ldots \quad (b) \end{array} \right. \]

\[ \lambda: \text{wavelength of light} \]

when optical path difference meet the conditions of equation (a), the optical interference will increase the intensity of the light. Similarly, the optical interference will decrease the intensity of the light with optical path difference meeting the conditions of equation (b). If the value of optical path difference is too small to meet the conditions of equation (a) or (b), the stable optical interference will not be occurred.
