

Red Phosphorescent Organic Light-Emitting Diodes of Ir(III) Complex Containing Phenyl-Lepidine Ligand

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We designed and synthesized a orange-red Iridium(III) complex, bis(4-methyl-2-phenylquinoline)iridium(III)(acetylacetonate) (MPQ)₂Ir(acac), for use in phosphorescent organic light-emitting diodes (OLEDs). The photophysical and electrochemical properties of (MPQ)₂Ir(acac) were characterized by photoluminescence (PL) and cyclic voltammetry (CV). The geometrical configuration for heteroleptic complex of (MPQ)₂Ir(acac) exhibit *N,N*-trans geometry. The device structure of PHOLEDs was ITO (50 nm)/PEDOT:PSS (40 nm)/TAPC (20 nm)/mCP (10 nm)/TCTA:TPBi:dopant (x%)/TSPO1 (35 nm)/LiF (1 nm)/Al (200 nm). In these devices, the dopants were Ir(III) complex, the doping ratio of TCTA to TPBi was 1:1, and the doping ratios of the red dopants (x%) were 5%, 10%, and 15%. The device employing Ir(III) complex as the dopant exhibited efficient orange emission with a maximum luminance, luminous efficiency, power efficiency and quantum efficiency of 5,235 cd/m² at V, 20.4 cd/A, 10.9 lm/W and 11.1% at 2.5 mA/cm², respectively, with Commission Internationale de l'Éclairage coordinates (CIE) of (0.59, 0.41) at 6.5 V.

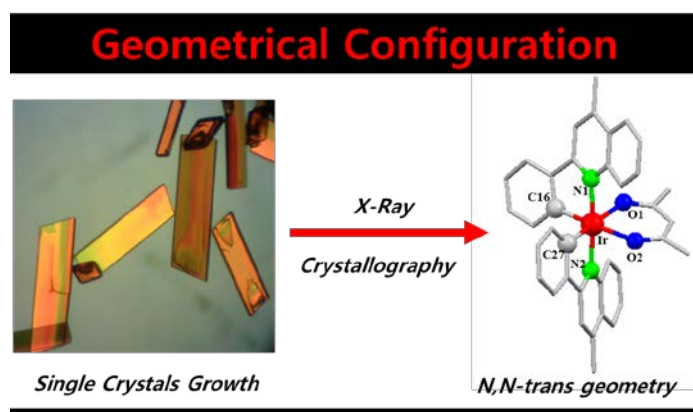


Fig. 1. Single-crystal structure of (MPQ)₂Ir(acac)

Acknowledgment

This work was supported by the Industrial Strategic Technology Development Program (No. 10039141, Development of Core Technologies for Organic Materials Applicable to OLED Lightings with High Color Rendering Index) funded by the Ministry of Knowledge Economy (MKE), Korea.

References

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Poster presentation