Electron Transport at the Nanoscale Focus Topic
Room: Central Hall - Session ET-ThP

Electron Transport at the Nanoscale Poster Session

ET-ThP1 The Performance of Organic Light-Emitting Diodes with Rb_2CO_3-doped Alq_3Layer for Improving Carrier-Injecting Probability, ***J.W. Park***, *J.T. Lim, J.S. Oh, G.Y. Yeom*, Sungkyunkwan University, Republic of Korea

Organic light-emitting diodes (OLEDs) is strongly influenced by both the injection barrier height and the number of carriers in the metal/organic contact formed between the Fermi levels (EF) of the electrodes and the relevant levels for conduction in the OLED.

In this study, this study elucidates the enhancement of the optoelectronic properties of OLEDs by n-doping effect of rubidium carbonate (Rb_2CO_3)-doped tris(8-quinolinolato)aluminum (III) (Alq_3). The device performance strongly depends on both doping concentrations of the Rb_2CO_3-doped Alq_3 layer and the thickness. As the doping concentration is increased from 2.5% to 50%, the electron ohmic properties of the electron-only device with the glass/ITO/ Rb_2CO_3-doped Alq_3 (10 nm)/Al structure were improved at doping concentration of 10%, due to the increase in the *n*-type doping effect. However, the Alq_3 molecules were decomposed above the doping concentration of 10%. Also, the photoemission spectra revealed that the *n*-type doping effect cause the lowering of the electron-injecting barrier height, as well as the improvement of the electron conductivity. The OLED with the glass/ITO/MOOX-doped NPB (25%, 5 nm)/NPB (63 nm)/Alq_3 (32 nm)/ Rb_2CO_3-doped Alq_3 (10%, 10 nm)/Al (100 nm) structure showed both a high maximum luminance of 114,400 cd/m2 at 9.8 V and a high power efficiency of 2.7 lm/W at about a luminance of 1000 cd/m2.

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