SP7.02

Design and Fabrication of High Efficiency Phosphorescent OLEDs

S. Watanabe (a), N. Ide (b), J. Kido (b,c)

(a) *Graduate school of Science and Engineering, Yamagata University, Japan*
(b) *Optoelectronic Industry and Technology Development Association, Japan*
(c) *Department of Polymer Science and Engineering, Yamagata University, Japan*

In this work, the power efficiency of organic light emitting diodes (OLEDs) was improved by increasing the internal quantum efficiency, reducing the drive voltage and enhancing of the optical out-coupling efficiency. High quantum efficiency was achieved by using fac-tris(2-phenylpyridine) iridium complex ($Ir(ppy)_3$) and wide-energy-gap materials with high triplet energies. The organic layers at the electrode interfaces were chemically doped, *p*-type and *n*-type, to reduce operating voltage. Furthermore, we optimized the optical interference effect by using various thicknesses of the *n*-doped layer with high conductivity. The optimized device exhibited green emission peaking at approximately 510 nm, and the external quantum efficiency (EQE) of 24.5% (88 cd/A). A high power efficiency of 90 lm/W was observed at 100 cd/m^2 (3.05 V).