Potential of New Semitransparent Tri-Metal Conductor on Flexible Blue Phosphorescent OLEDs According to the Electron Transporting Layer

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Transparent electrodes instead of indium-tin-oxide (ITO) recently have graduated rapidly from an issue of research interest to a conductor with a wide range of applications including organic light-emitting diodes (OLEDs) and flexible applications or other light sources for ITO-free transparent conductor. Here, we would like to point out that many works have been studied with ITO which is commonly applied in OLEDs even though ITO has critical drawbacks such as uneven surface morphology, low mechanical flexibility, limited supply of indium material, and high toxicity [1, 2]. In this work, we proposed that ITO-free semitransparent Ni/Ag/Ni tri-metal conductor could be applied in flexible blue phosphorescent OLEDs, which have sensitive light response of blue range with high energy as can be seen in Fig. 1. Although the highest electrical and optical characteristics values, such as luminance efficiency and external quantum efficiency, using ITO electrode were better than that of devices using tri-metal conductor, roll-off efficiency and device stability were suitable for blue phosphorescnet OLEDs.

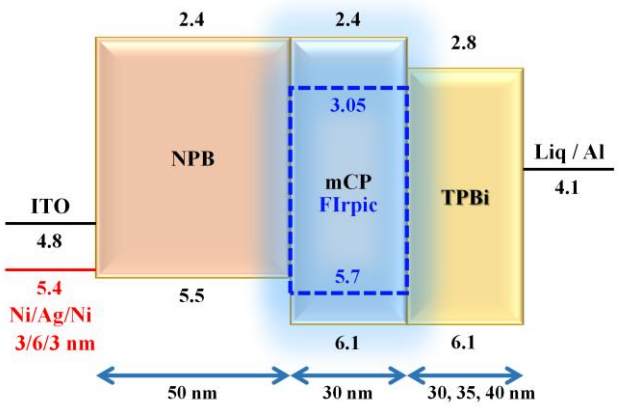

Fig. 1. Device Structures and energy-level diagrams of blue phosphorescent OLED according to the various ETL conditions and ITO or semitransparent tri-metal conductor on glass and flexible substrate.

This work, consequently, could be proposed on additional flexible OLEDs and light applications for ITO-free process. The detailed electroluminescence and other electrical or optical characteristics would be discussed with graphs and tables.

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