

Preparation and Application of the New Hole-transporting Material for Vacuum-deposited Green Phosphorescent OLEDs

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In the research of functional pi-conjugated materials, organic light-emitting diode (OLED) is one of the example of actual commercialization, which enables the realization of ultra-thin and flexible displays. Among various layers and materials in OLEDs, HTLs are important to reduce the driving voltage, and to increase the efficiency of the device. However, from the viewpoint of the chemical structures, most of the HTMs in current OLEDs are limited to arylamine derivatives, and new innovative design of HTMs is still so necessary. In this work, we designed and synthesized a new kind of HTM for vacuum-deposited green phosphorescent OLEDs. The chemical structures of the new material were confirmed by ¹H and ¹³C NMR spectroscopy, and high-resolution mass spectroscopy. The electro-optical and thermal properties of the synthesized compounds were compared by measuring the UV-vis., PL spectroscopy, TGA, and DSC analysis. The OLED device using the new HTM outperformed the control devices using NPB or TAPC as HTMs, and it showed a maximum current efficiency higher than 60 cd/A.