WET PROCESS FEASIBLE NOVEL FLUORENE-BASED MOLECULAR HOLE TRANSPORTING LAYER FOR PHOSPHORESCENT ORGANIC LIGHT EMITTING DIODES

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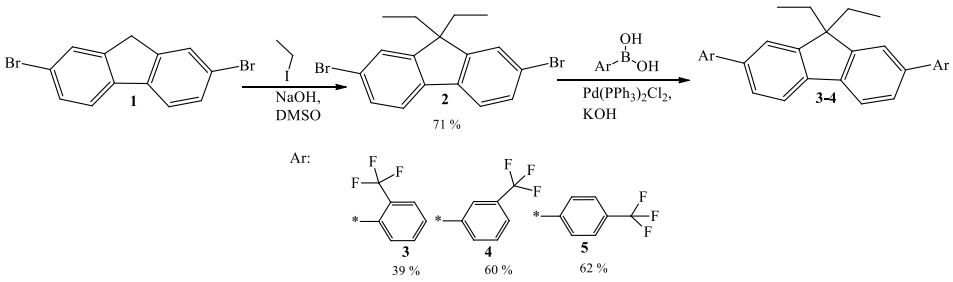
Organic light emitting diodes (OLEDs) are widely used in high-quality displays and show great potential lighting because of their superior characteristics [1-2]. OLED possesses significant features for flat-panel display applications such as: self-emitting property, high luminous efficacy, full-color ability, wide viewing angle, high contrast, low power consumption, low weight, potentially large area, color displays, and flexibility [3].

In this study, we report a series of novel fluorene-based solution processable hole transporting materials (HTMs). The synthesis of the electroactive compounds (**3-5**) is shown in **Scheme 1**.



Scheme 1. Schematic illustration of synthesis of the fluorene type HTMs, **3**, **4**, and **5.**

The synthesized HTMs have an exceptional solubility in common organic solvents and possess good thermal stability to form morphologically stable films. The relevant molecular energy level alignment, adequate ionization potential and high triplet energies promote materials performance as a good hole transporting layer. Solution-processed yellow phosphorescent OLEDs were fabricated by utilizing these HTMs with a conventional yellow emitter iridium(III)bis(4-phenylthieno[3,2-c]pyridinato-N,C2')acetylacetonate doped in 4,4′-bis(N-carbazolyl)-1,1′-biphenyl host. The best device with HTM **4** showed an improvement of 54% in current efficiency from 23.3 to 35.8 cd/A and improvement of 14% in external quantum efficiency from 11.3 to 12.9%, compared to reference device containing commercial N,N′-Bis(naphthalen-1-yl)-N,N′-bis(phenyl)benzidine (NPD) as HTM.

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References

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