

A Tetra-Substituted Chrysene: Orientation of Multiple Electrophilic Substitution And Use Of A Tetra-Substituted Chrysene As A Blue Emitter for OLEDs.

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Electronic Supplementary Information: Experimental details for the preparation and testing of the OLED device of 7.

OLED devices were fabricated by the thermal evaporation technique. The base vacuum for all of the thin film deposition was in the range of 10^{-6} torr. The deposition chamber was capable of depositing eight different films without the need to break up the vacuum. Patterned indium tin oxide (ITO) coated glass substrates from Thin Film Devices, Inc were used. These ITO's are based on Corning 1737 glass coated with 1400Å ITO coating, with sheet resistance of 30 ohms/square and 80% light transmission. The patterned ITO substrates were then cleaned ultrasonically in aqueous detergent solution. The substrates were then rinsed with distilled water, followed by *i*-propanol, and then degreased in toluene vapor.

The cleaned, patterned ITO substrate was then loaded into the vacuum chamber and the chamber was pumped down to 10^{-6} torr. The substrate was then further cleaned using an oxygen plasma for about 5 minutes. After cleaning, multiple layers of thin films were then deposited sequentially onto the substrate by thermal evaporation. Patterned metal electrodes (Al or LiF/Al) or bipolar electrode were deposited through a mask. The thickness of the film was measured during deposition using a quartz crystal monitor. The completed OLED device was then taken out of the vacuum chamber and characterized immediately without encapsulation.

The OLED samples were characterized by measuring their (1) current-voltage (I-V) curves, (2) electroluminescence radiance versus voltage, and (3) electroluminescence spectra versus voltage. The I-V curves were measured with a Keithley Source-Measurement Unit Model 237. The electroluminescence radiance (in the unit of cd/m^2) vs. voltage was measured with a Minolta LS-110 luminescence meter, while the voltage was scanned using the Keithley SMU. The electroluminescence spectrum was obtained by collecting light using an optical fiber, through an electronic shutter, dispersed through a spectrograph, and then measured with a diode array detector. All three measurements were performed at the same time and controlled by a computer. The efficiency of the device at certain voltage is determined by dividing the electroluminescence radiance of the LED by the current density needed to run the device. The unit is in cd/A .