Supporting Information

Synthesis of 2-Bromo-5-(trimethylsilyl)pyridine (a)

A solution of 2,5-dibromopyridine (5 g, 21.11 mmol) in dry ether (200 mL) was cooled to -78 °C addition of n-BuLi (7.02 g, 25.39 mmol, 2.5 M in hexane) over 10 min resulted in pale yellow solution. After stirring for 1 h, chlorotrimethylsilane (TMSCl) was added to the solution (3.74 g, 29.55 mmol). The solution was allowed to warm to room temperature overnight. Water (100 mL) was added to the diethyl ether. The organic layer was separated and dried (MgSO4), and concentrated under reduced pressure. The crude material was purified by vacuum distillation. Yield (3.5 g, 76%). \( \delta \): 8.35 (s, 1H), 7.61 (d, 1H), 7.42 (d, 1H), 0.32 (s, 9H) ppm.

Synthesis of 2-Bromo-4-(trimethylsilyl)pyridine (d)

A solution of 2,4-dibromopyridine (5 g, 21.11 mmol) in dry ether (200 mL) was cooled to -78 °C addition of n-BuLi (7.02 g, 25.39 mmol, 2.5 M in hexane) over 10 min resulted in pale yellow solution. After stirring for 1 h at this temperature, chlorotrimethylsilane (TMSCl) was added to the solution (3.74 g, 29.55 mmol). The solution was allowed to warm to room temperature overnight. Water (100 mL) was added to the diethyl ether. The organic layer was separated and dried (MgSO4), and concentrated under reduced pressure. The crude material was purified by vacuum distillation. Yield (3.5 g, 75%). \( \delta \): 81-84 °C (1.5 mmHg). \( ^1 \)H NMR (300 MHz, CDCl3, δ): 8.31 (d, 1H), 7.55 (s, 1H), 7.33 (d, 1H), 0.31 (s, 9H) ppm.

Synthesis of 2-(2,4-difluorophenyl)-5-(trimethylsilyl)pyridine (fptp) (c)

A mixture of ethyl pentfluoropropionate and hydrazine was added to the solution (3.74 g, 29.55 mmol). The solution was maintained at pressure under 10⁻³ torr during measurement to avoid degradation. The samples were prepared by the same method for the absolute PL efficiency measurement except not using an integrating sphere. Transient PL spectra were measured by the same set up as the absolute PL efficiency measurement, the samples were kept in inert environment by blowing nitrogen gas into the integrating sphere. The PL spectra were measured by the same set up as the absolute PL efficiency measurement except not using an integrating sphere. Transient PL experiments of dyes were performed with a Nd:YAG laser (10 Hz, 9 ns pulse) and a photomultiplier tube with a monochromator. The samples were prepared by the same method for the absolute PL efficiency measurement and kept in a vacuum chamber maintained at pressure under 10⁻¹ torr during measurement to avoid degradation.

Supporting Information

In the Supporting Information, the synthesis of various compounds is detailed. Here are the key points:

- **Synthesis of 2-Bromo-5-(trimethylsilyl)pyridine (a)**: A solution of 2,5-dibromopyridine (21.11 mmol) in ether is treated with n-BuLi followed by chlorotrimethylsilane (TMSCl). The resulting mixture is left to warm overnight, and the crude product is purified by vacuum distillation. Yield: 76%.

- **Synthesis of 2-Bromo-4-(trimethylsilyl)pyridine (d)**: A solution of 2,4-dibromopyridine (21.11 mmol) in ether is treated with n-BuLi and TMSCl. The crude product is purified by vacuum distillation. Yield: 75%.

- **Synthesis of 2-(2,4-difluorophenyl)-5-(trimethylsilyl)pyridine (fptp) (c)**: A mixture of ethyl pentfluoropropionate and hydrazine is added to the solution, and the crude product is purified by chromatography. Yield: 70%.

The Supporting Information provides detailed synthetic procedures, yields, and spectroscopic data for these compounds, which are crucial for understanding their properties and potential applications.

**Instrument**

HR NMR spectra were recorded using a Bruker Avance-300 MHz FT-NMR spectrometer, and chemical shifts were reported in ppm units with tetramethylsilane as internal standard. FT-IR spectra were recorded using a Bruker IFS66 spectrometer. Thermogravimetric analysis (TGA) was performed under nitrogen using a TA instruments 2050 thermogravimetric analyzer. Differential scanning calorimeter (DSC) was conducted under nitrogen using a TA instrument DSC Q10. All the samples were heated at a rate of 10 °C/min. Absorption spectra of dyes were measured in dichloromethane solution (~10⁻⁵ M) by UV-visible spectrophotometer (Varian Cary 5000). The absolute PL efficiency of each dopant was measured under an integrating sphere method developed by de Mello et al. A He-Cd laser was used as the excitation source and a monochrometer attached with a photomultiplier tube as detector system. All the systems were calibrated by using a standard tungsten–halogen lamp and a deuterium lamp. The samples for the measurement were prepared by co-deposition on quartz substrates with N,N-dicabazolyl-3,5-benzene as host material.

**Fabrication of OLEDs**

The patterned ITO glasses were cleaned with acetone and isopropyl alcohol and treated with UV-ozone to further clean organics and to increase the work function of ITO. All organic layers and cathode were successively evaporated by the thermal evaporator onto the cleaned ITO without breaking vacuum (< 5 × 10⁻⁵ torr).
10^{-7} \text{torr}). After deposition, the devices were encapsulated with glass cans in nitrogen environment. The current density-voltage-luminance (J-V-L) characteristics of the devices were measured by a spectro radiometer (Photo Research Co., PR- 650) linked to a source meter (Keithley 2400).