Supporting information

Determination of the doping concentrations in the white-emissive DSB⊂Tc-Pc crystal

Chromatograph analysis was used to determine the guest-host mol ratios of Tc, Pc and DSB in the doped crystals prepared under different experimental conditions. One example is given as following. Firstly, a standard solution with mol ratios of Tc: DSB: Pc=1: 10: 1 was prepared and subjected to chromatograph analysis. As shown in Figure S1a, there were three signals with different retention times of 13 min, 24 min and 29 min that correspond to Tc, DSB and Pc respectively. Then, the doped crystals were dissolved and analyzed by chromatograph under the same conditions. By comparing the integral areas of the signals for Tc, DSB and Pc of the samples with those of the standard, the mol ratios between the three components were determined, as shown in Figure S1 b and c. The same method was applied to determine the mol ratios of two components in DSB⊂Tc and DSB⊂Pc crystals.

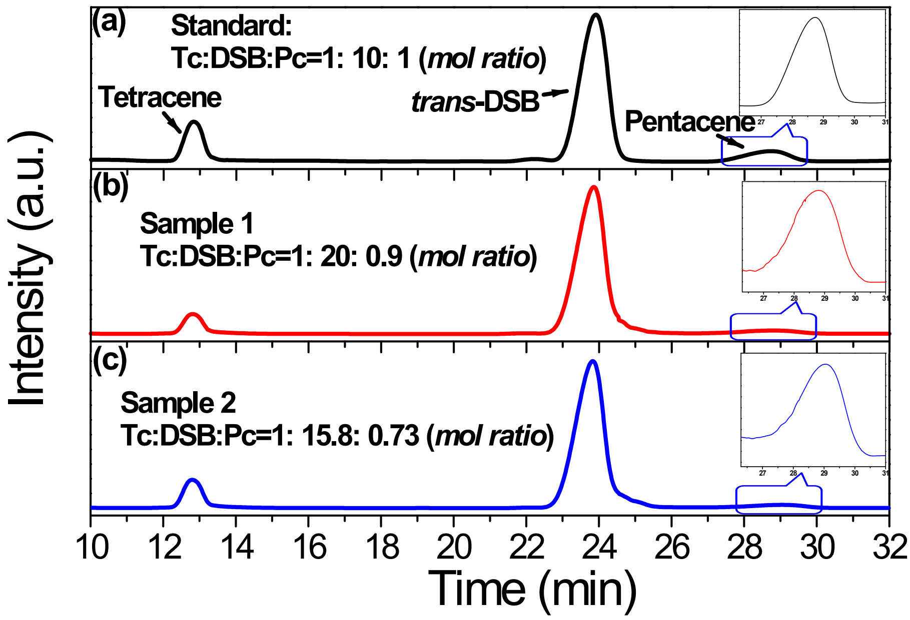

Figure S1. The chromatographs of the mixture of Tc, DSB and Pc with different mol ratios. (a) Standard with Tc: DSB: Pc=1: 10: 1; (b, c) The mol ratios of the three components were determined to be Tc: DSB: Pc=1: 20: 0.9 and 1: 15.8: 0.73 respectively, by comparison with the standard.

The emission data of DSB⊂Tc and DSB⊂Pc crystals with different mol ratios.

By controlling the doping concentrations of Tc or Pc molecules in the doped crystals, DSB⊂Tc (DSB: Tc = 33: 1, 18: 1) and DSB⊂Pc (DSB: Pc = 28: 1, 16: 1) crystals with different mol ratios of host to guest molecules are obtained, as shown in Figure S2.

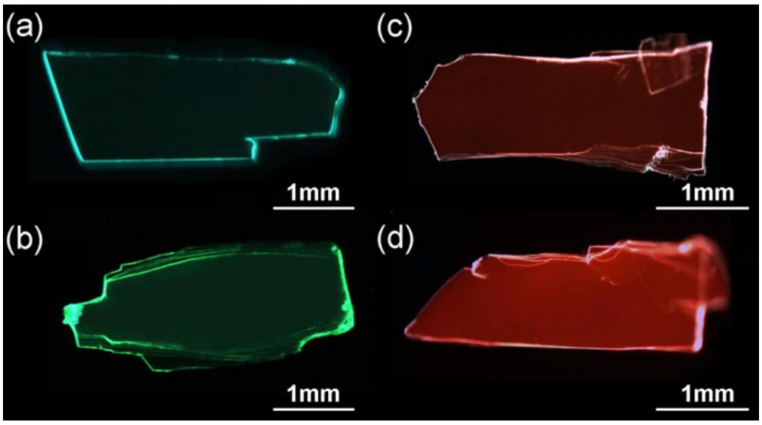

Figure S2. The optical photographs of DSB⊂Tc and DSB⊂Pc crystals with different mol ratios under the ultraviolet lamp. (a) DSB: Tc = 33: 1; (b) DSB: Tc = 18: 1; (c) DSB: Pc = 28: 1; (d) DSB: Pc = 16: 1.

Figure S3 shows the photoluminescence spectra of DSB⊂Tc and DSB⊂Pc crystals corresponding to the ones shown in Figure S2.

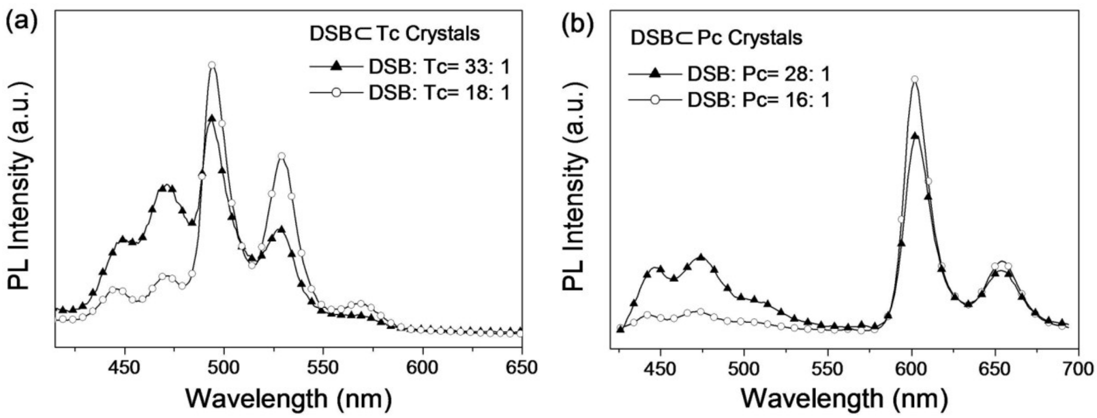

Figure S3. (a) Photoluminescence spectra of DSB⊂Tc crystals (a) and DSB⊂Pc crystals (b) with different mol ratios of host to guest molecules.

The pure DSB crystal-based field-effect transistor.

Figure S4 shows the the output and transfer characteristics of top-contact p-type OFET based on the pure DSB crystal. The value of measured hole mobility can be up to ~0.02 cm^2/Vs.

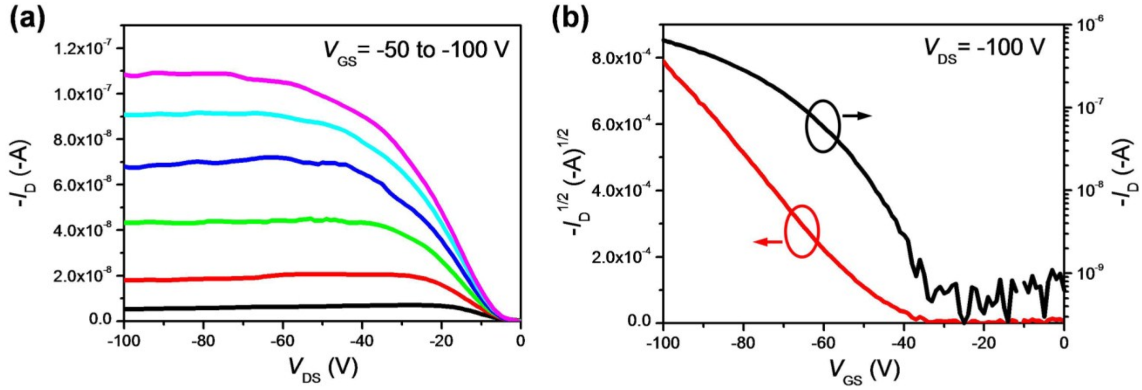

Figure S4. Output characteristics (a) and transfer characteristics (b) of OFETs based on the pure DSB crystal with symmetric gold electrodes. Channel length (*L*) and width (*W*) were *L*= 100 μm and *W*= 250 μm.

The emissions of DSB⊂Tc-Pc thin film under the pumping laser energy excitation.

A doubly doped DSB⊂Tc-Pc thin film (DSB: Tc: Pc= 300: 1: 1) with the 300 nm thickness was prepared by the vacuum deposition, which is used to the color stability test of the pumping laser excitation with different energy. The thin film emission spectra (Figure S5) present a distinct variation with the pumping laser energy increasing from 12 to 60 KW/cm^2, which may be due to the molecular aggregate state change from amorphous to crystalline in the doped thin film induced by the thermal effect of higher laser energy radiation.

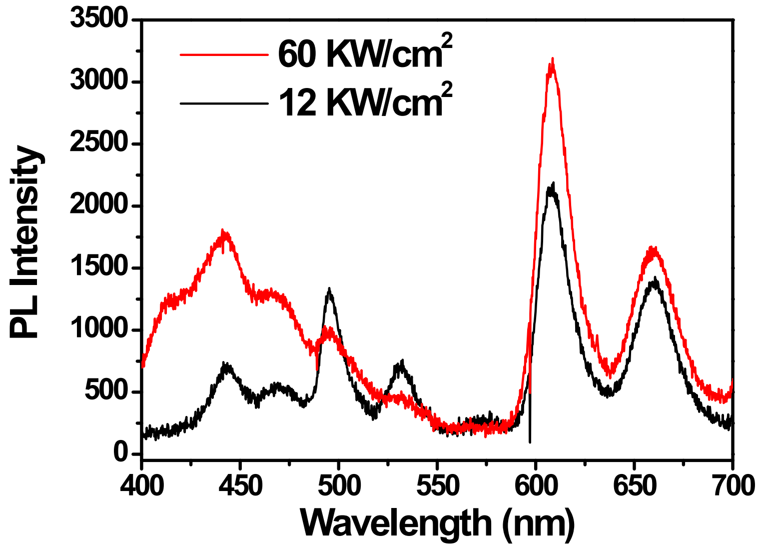

Figure S5. Photoluminescence spectra of the doubly doped DSB⊂Tc-Pc thin film as the variation of the pumping laser energy.