Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information for

n-Type organic light-emitting transistors with high mobility and improved air stability

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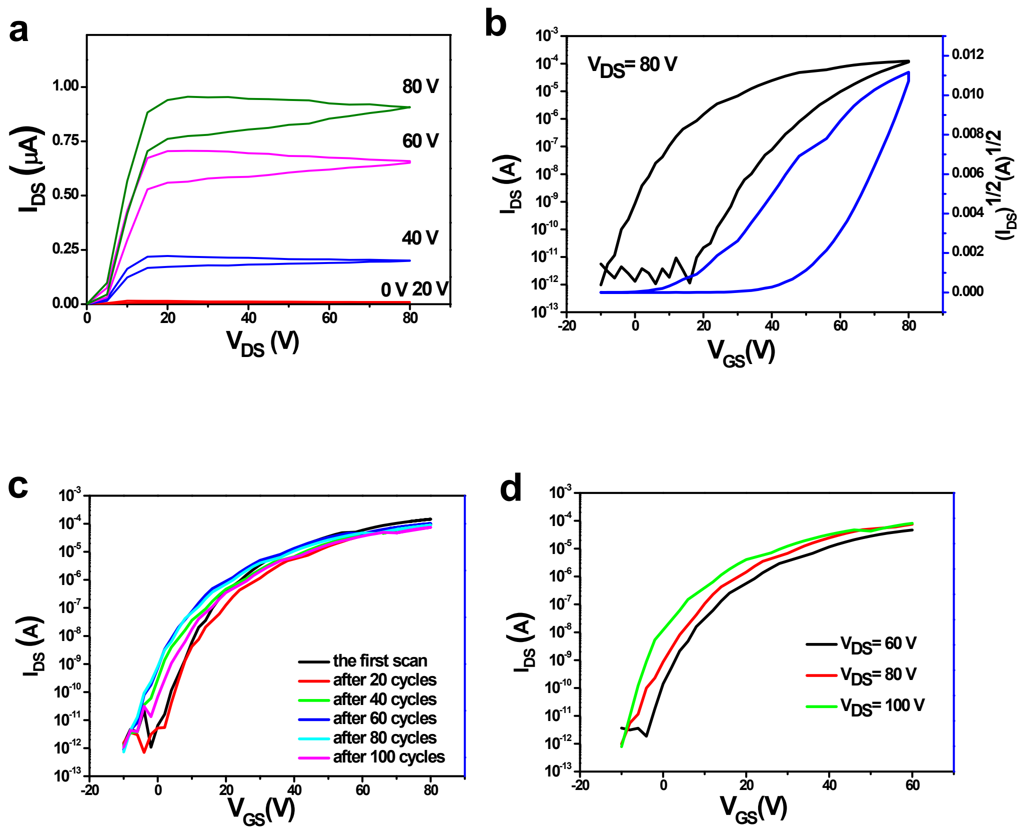


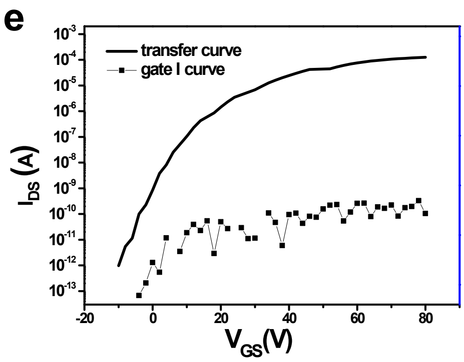
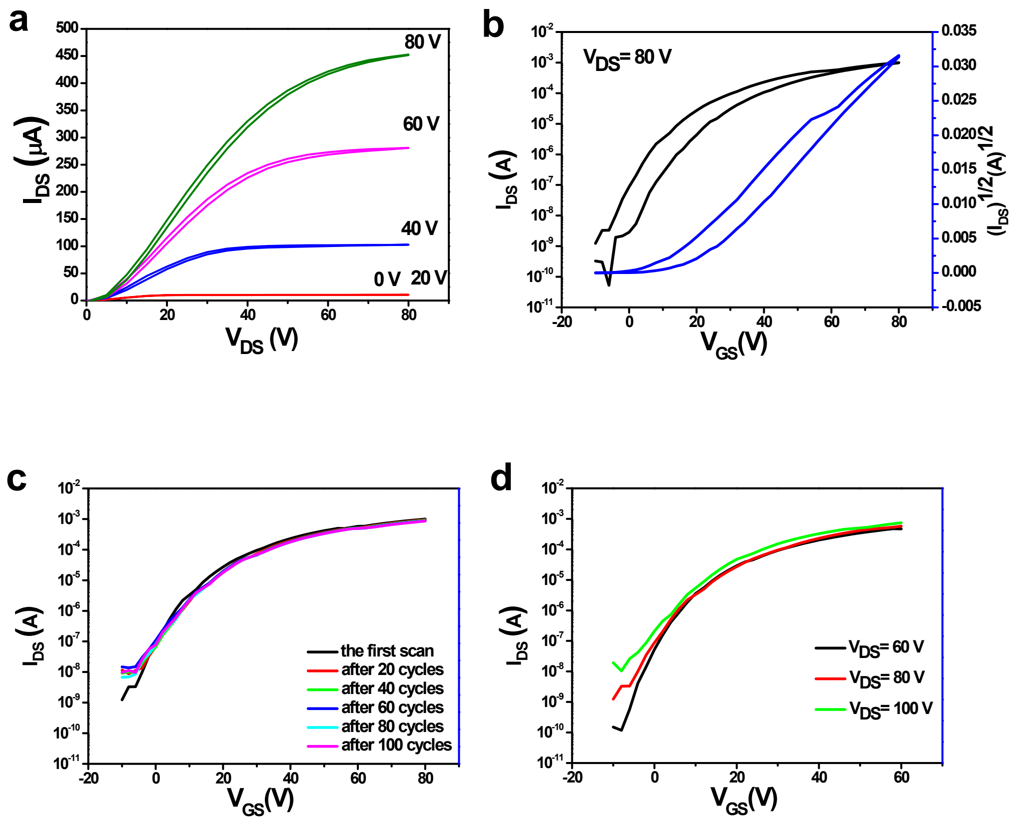


Fig S1. (a) Forward and backward scan of output curves. (b) Forward and backward scan of transfer curves. (c) Operation stability measurement. (d) Transfer curve under different V_{DS}. (e) Gate leakage current for BGBC OTFTs without thermal treatment in air



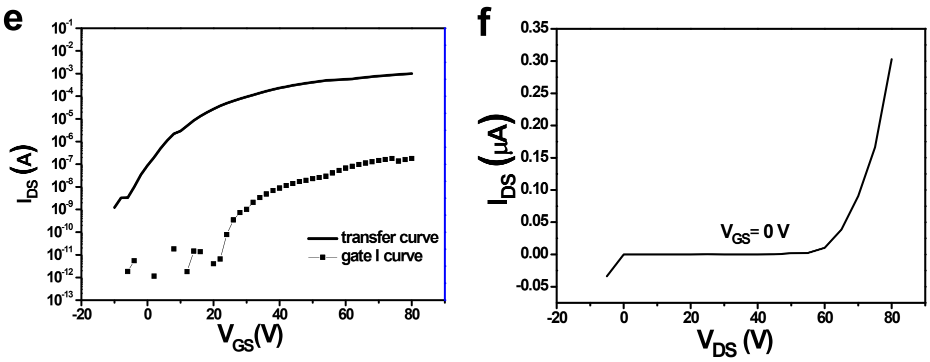


Fig S2. (a) Forward and backward scan of output curves. (b) Forward and backward scan of transfer curves. (c) Operation stability measurement. (d) Transfer curve under different V_{DS}. (e) Gate leakage current. (f) Single string of output curves at V_{GS} = 0 V for BGBC OTFTs with thermal annealing at 180 °C in air

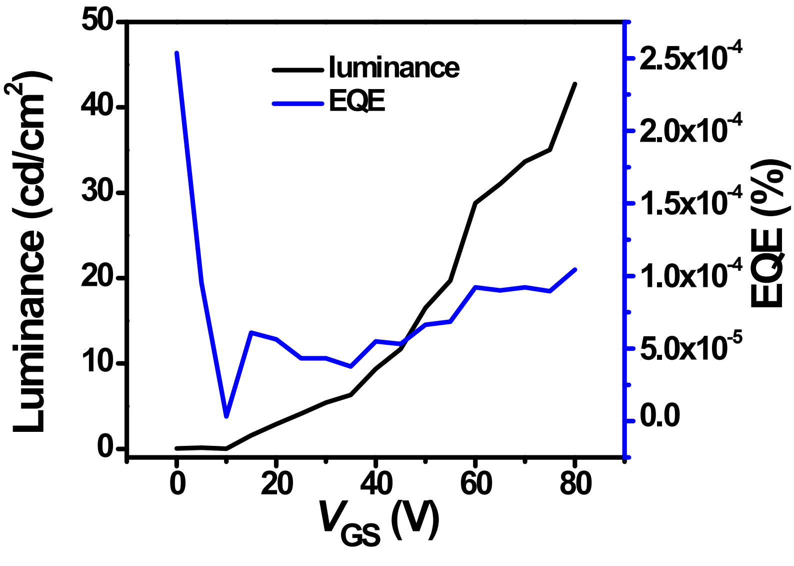


Fig. S3. Curves of luminance and EQE vs. V_{GS}.

1. Calculating EQE based on EL spectrum

In an EL spectrum, the intensity in unit of s^{-1} nm^{-1} (I_1) at a given wavelength (λ in nm) is recorded. Thus, the intensity in unit of W nm^{-1} (I_2) at the same wavelength is given by

$$I_2 = I_1 \times \frac{1240}{\lambda} \times 1.6 \times 10^{-19}. \quad (1)$$

The total radiant power in W (I_3) of the emitted light can be obtained via integrating the I_2 over the EL spectrum, expressed as

$$I_3 = k\int I_2 d\lambda. \quad (2)$$

Incorporating Eq. 1 into Eq. 2, one can obtain

$$I_3 = k\int I_1 \times \frac{1240}{\lambda} \times 1.6 \times 10^{-19} d\lambda. \quad (3)$$

Because the I_1, I_3, and λ are known, the k is then calculated. The total photon flux in s^{-1} (I_4) of the emitted light can be obtained via integrating the I_1 over the EL spectrum, expressed as

$$I_4 = k\int I_1 d\lambda. \quad (4)$$

The number of electrons (N in s^{-1}) flowing through the loop is given by dividing the current (I in A) by the electric charge of one electron. Then, the EQE is obtained by dividing the I_4 by the N.

2. Calculating luminance (L in cd/m^2) based on the EL spectrum

Mathematically, for a given EL spectrum, the luminous flux quantity (LF in lm) of the emitted light is given by

$$LF = k\int I_2 \times P_H d\lambda, \quad (5)$$

where the P_H is the photopic luminous efficiency. Assuming the emissive area (Area in m^2) to be a lambertian source, the L is given by

$$L = \frac{LF}{\pi \times Area}. \qquad (6)$$

The light emitting region is estimated as 1 nm near the electrode.

Reference:

[1] D. S. Qin, Y. Tao, *Appl. Phys. Lett.* 2005, **86**, 113507.