Supporting Information

Fully Transparent Conformal Organic Thin-Film Transistor Array and Its Application as LED Front Driving

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S1. Absorption and transmittance spectra of C$_8$-BTBT film.

**Fig. S1** (a) Absorption and (b) transmittance spectrum of the C$_8$-BTBT film on quartz substrates.

Once the absorption edges were extracted in Fig. S1a, the optical bandgap could be calculated from the relationship in the following equation:

\[
\lambda = \frac{hc}{E_g}
\]

$\lambda$: Wavelength of absorption edge  
$h$: Planck’s constant  
$c$: Speed of light  
$E_g$: Optical bandgap

<table>
<thead>
<tr>
<th>Organic film</th>
<th>Absorption edge (nm)</th>
<th>Optical bandgap (eV)</th>
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</thead>
<tbody>
<tr>
<td>C$_8$-BTBT</td>
<td>376</td>
<td>3.3</td>
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S2. Movie file of the peeling process of the device array from the OTS modified Si substrate with 3M tape.
S3. Elimination of the effects from mechanical damage in the transfer process.

Fig. S3 (a) Schematic view of the transfer process for the OTFT between two SiO$_2$ substrates. (b) Transfer characteristics of the OTFT on SiO$_2$-1 and SiO$_2$-2.
S4. Formula for mobility calculation.

The field-effect mobility was calculated from the measured transfer curves (Fig. 3b) in the saturation regime \((V_{DS} \geq V_G)\), using the equation

\[
\mu = \frac{2L}{W_C} \left( \frac{\partial \sqrt{I_{DD}}}{\partial V_G} \right)^2
\]

where \(W\) is the channel width, \(L\) is the channel length. For the adopted interdigital electrode, the channel width is 3500 \(\mu m\), and the length is 100 \(\mu m\). \(C_i\) denotes the capacitance per unit area of the gate dielectric layer, in this case 7.5 nF/cm\(^2\) for the 400 nm C-PVA.

![Capacitance–frequency plots of the 400 nm C-PVA.](image)
S5. Bending cycle test on OTFTs.

**Fig. S5** Averaged normalized change in mobility $\Delta \mu / \mu_0$ for OTFTs as a function of bending cycles under tension. The bending curvature was 0.8 mm. $\Delta \mu = \mu - \mu_0$, where $\mu$ and $\mu_0$ represent the hole mobility of the same transistor measured after and before bending.
S6. Thermal stability of the transparent conformal OTFT.

**Fig. S6** Averaged normalized change in mobility $\Delta \mu / \mu_0$ for OTFT as a function of temperature. $\Delta \mu = \mu - \mu_0$, where $\mu$ and $\mu_0$ represent the hole mobility of the same transistor measured at certain temperature and room temperature (20 °C).
S7. Movie file of the luminance of LED controlled by the OTFT placed upon the LED at $V_{DD} = -40$ V.
S8. Configuration of a common cathode seven-segment display (SSD).

For a common cathode configuration, all LED cathodes are connected. And each segment is labeled (a) thru (g). For example, when the Segments a, b, d, e, and g were on, c and f were off, number “2” could be displayed. The segments could be controlled by our transistor array, and different numbers were displayed.

Fig. S8 Configuration of the common cathode seven-segment display (SSD).