Supporting information

A high-performance ambipolar organic field-effect transistors based on a bidirectional $\pi$-extended diketopyrrolopyrrole under ambient conditions

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1. Table

Table S1. Calculated absorption wavelength (nm), oscillator strength ($f$) and transition nature of DPP-2T2P-2DCV at CAM-B3LYP/6-31g* level of theory in chloroform solvent.

<table>
<thead>
<tr>
<th>State</th>
<th>$\lambda_{max}$ (nm)</th>
<th>$f$</th>
<th>Main contributions</th>
<th>Character</th>
</tr>
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<tbody>
<tr>
<td>$S_0 \rightarrow S_1$</td>
<td>595.4</td>
<td>2.0101</td>
<td>HOMO $\rightarrow$ LUMO (88%)</td>
<td>CT(DPP $\rightarrow$ B-DCV)</td>
</tr>
<tr>
<td>$S_0 \rightarrow S_3$</td>
<td>368.3</td>
<td>1.3508</td>
<td>H-2 $\rightarrow$ LUMO (25%), H-1 $\rightarrow$ L+1 (17%), HOMO $\rightarrow$ L+2 (51%)</td>
<td>CT(DPP $\rightarrow$ B-DCV)</td>
</tr>
<tr>
<td>$S_0 \rightarrow S_6$</td>
<td>335.5</td>
<td>0.4475</td>
<td>H-2 $\rightarrow$ LUMO (46%), HOMO $\rightarrow$ L+2 (32%)</td>
<td>LE(\pi $\rightarrow$ \pi*)</td>
</tr>
</tbody>
</table>

2. Figures

![Figure S1](image1.png)

Fig. S1  FT-IR spectrum of DPP-2T2P-2DCV and DPP-2T2P-2CHO.

![Figure S2](image2.png)

Fig. S2. (left) Thermogravimetric analysis and (right) differential scanning calorimetry curves for DPP-2T2P-2DCV.
**Fig. S3** Calculated absorption spectra of compound 1 (black solid) compared with experimental spectra (white solid) in acetonitrile.

**Fig. S4** Typical output curves of the OFET devices in air.
Fig. S5 Typical output (a,b) and transfer (c,d) curves of the OFET devices in nitrogen.

3. Characterization

Fig. S6 $^1$H NMR spectrum of DPP-2T2P-2CHO in CDCl$_3$. 
Fig. S7 $^{13}$C NMR spectrum of DPP-2T2P-2CHO in CDCl$_3$.

Fig. S8 Mass spectrum of DPP-2T2P-2CHO.
Fig. S9 $^1$H NMR spectrum of **DPP-2T2P-2DCV** in CDCl$_3$.

Fig. S10 $^{13}$C NMR spectrum of **DPP-2T2P-2DCV** in CDCl$_3$. 
Fig. S11 Mass spectrum of **DPP-2T2P-2DCV**.