Supplementary Information

Flexible Electrochromic Energy-saving Windows with Fast Switching and Bistability Based on Transparent Solid-state Electrolyte

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1. Optoelectrochemical properties of PTCDA, 4E-2B-COOCH₃, and transparent solid-state electrolyte

![Figure S1.](image)

Figure S1. a) UV-vis absorption spectra of PTCDA and 4E-2B-COOCH₃ films; b) transmittance spectra of solid-state electrolyte (insets were photos of solid-state electrolyte); cyclic voltammetry curves of c) PTCDA film and d) 4E-2B-COOCH₃ film.

2. AC impedance spectroscopy of the T-SE

![Figure S2.](image)

Figure S2. Nyquist impedance plots for Cu/T-SE/Cu at room temperature.
3. Spectroelectrochemistry of ECD 3, and ECD 4 under bending state

![Fig. S3](image_url) Spectroelectrochemistry of (a) ECD 3, and (b) ECD 4 under bending state.

4. Chronoamperometry of ECD 3 and ECD 4 under bending state

![Fig. S4](image_url) Chronoamperometry of (a) ECD 3 and (b) ECD 4 under bending state.
5. Proposed electrochromic mechanism of PTCDA

Scheme S1. The proposed electrochromic mechanism diagram of PTCDA.

6. Optoelectrochemical properties of compound films

<table>
<thead>
<tr>
<th>Film</th>
<th>$\lambda_{\text{edge}}$ a) (nm)</th>
<th>$E_g^\text{opt}$ b) (eV)</th>
<th>$E_{\text{ox onset}}$ (V)</th>
<th>$E_{\text{red onset}}$ (V)</th>
<th>$E_{\text{HOMO}}$ c) (eV)</th>
<th>$E_{\text{LUMO}}$ d) (eV)</th>
<th>$E_{\text{elec}}$ e) (eV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTCDA</td>
<td>596</td>
<td>2.08</td>
<td>+0.87</td>
<td>-0.54</td>
<td>-5.27</td>
<td>-3.94</td>
<td>1.41</td>
</tr>
<tr>
<td>4EDOT-2B-COOCH$_3$</td>
<td>601</td>
<td>2.06</td>
<td>+0.46</td>
<td>-0.78</td>
<td>-4.86</td>
<td>-3.62</td>
<td>1.24</td>
</tr>
</tbody>
</table>

a) band edge wavelength; b) $E_g^\text{opt} = 1240/\lambda_{\text{edge}}$; c) $E_{\text{HOMO}} = -e(E_{\text{ox onset}} + E_{\text{ref}})$; d) $E_{\text{LUMO}} = -e(E_{\text{red onset}} + E_{\text{ref}})$; e) $E_{\text{elec}} = E_{\text{LUMO}} - E_{\text{HOMO}}$