

Supporting Information

Synthesis of p-type semiconducting phenothiazine exfoliatable layered crystal

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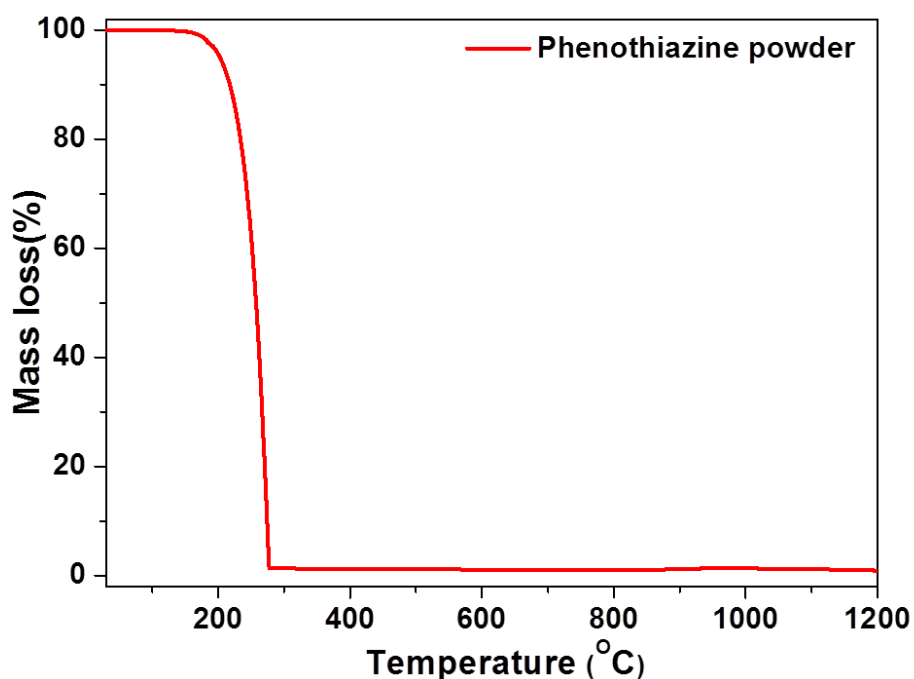


Figure S1. Thermogravimetric analysis (TGA) data of PTZ powder showing vaporization of PTZ powder starting at around 180 °C.

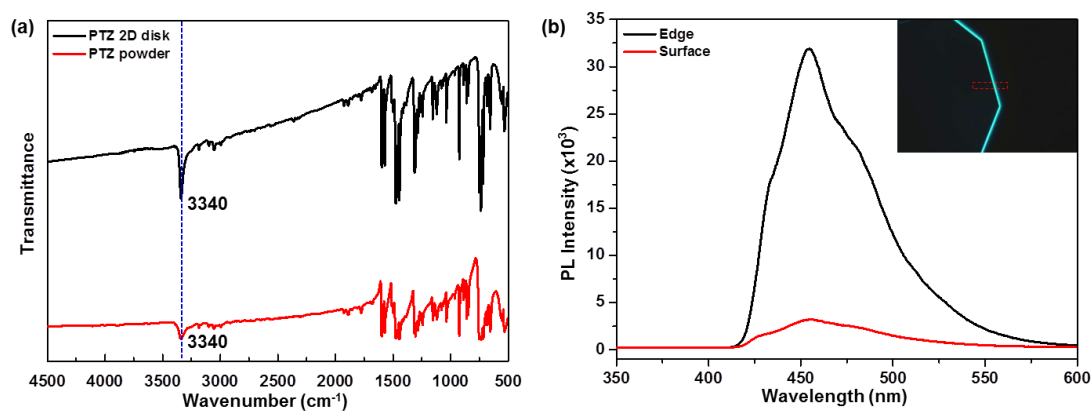


Figure S2. (a) FTIR spectra of PTZ powder (red line) and crystal (black line). Blue dotted line at 3340 cm^{-1} indicates N-H stretching vibration. (b) PL spectra of edge emission (black) and surface emission (red) of a PTZ crystal. Inset is a fluorescence microscope image showing dominant luminescence from the edges of the PTZ crystal ($\lambda_{\text{ex}} = 330 - 380\text{ nm}$, $\lambda_{\text{em}} = 420\text{ nm}$ long-pass filter, exposure time = 0.4 s).

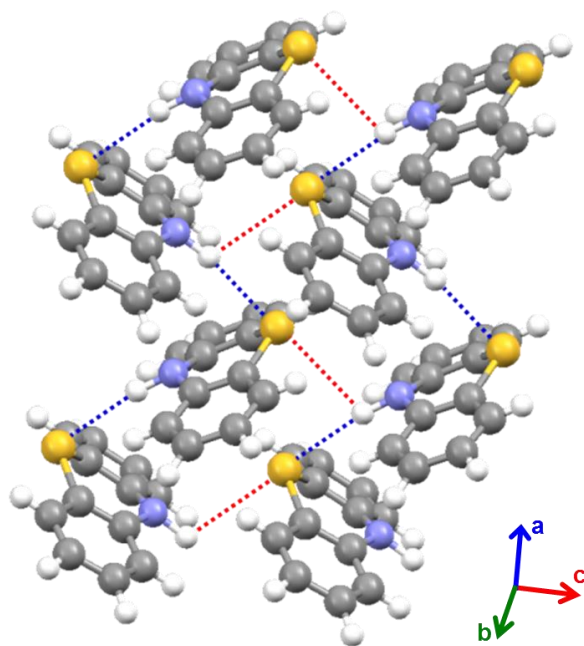


Figure S3. Packing of PTZ molecules on (020) plane.

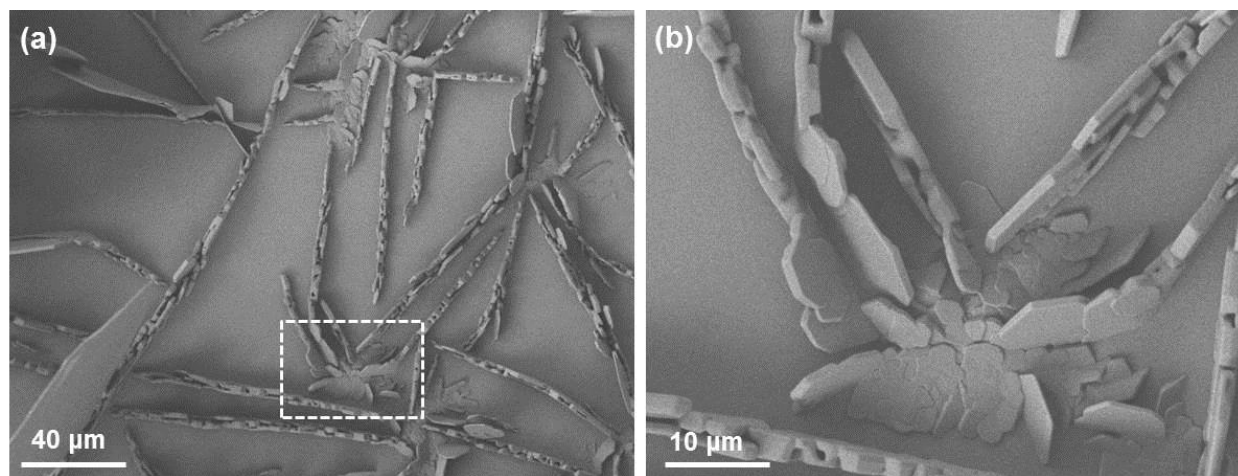


Figure S4. (a) SEM image of PTZ crystals taken after 5 min of reaction. (b) Magnified view of the boxed region in (a).

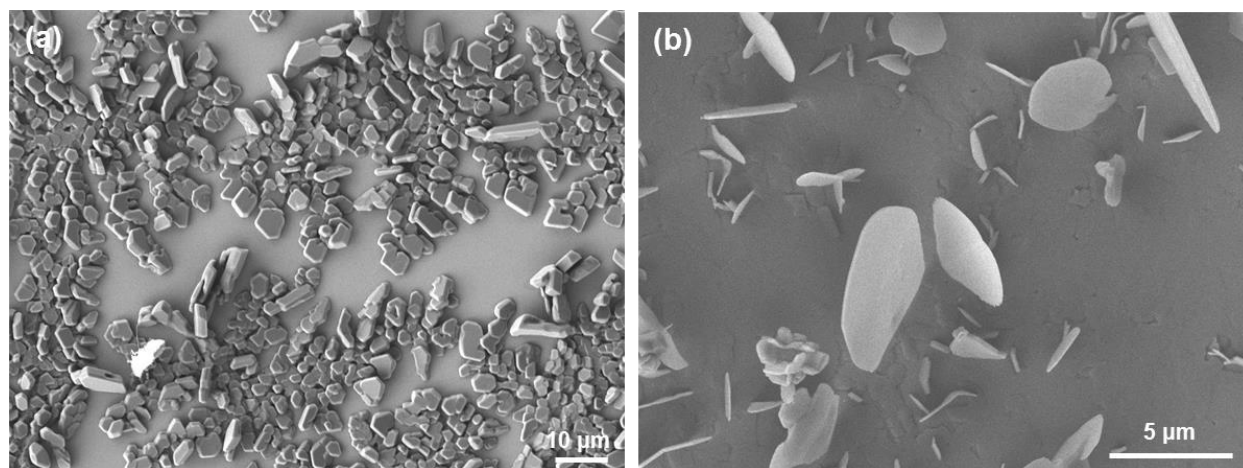


Figure S5. SEM images of (a) anthracene crystals, and (b) pentacene crystals.

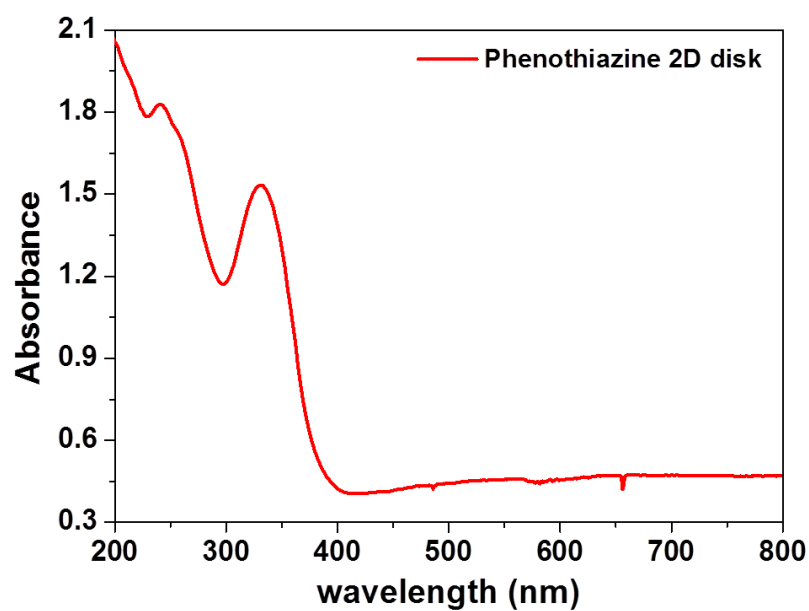


Figure S6. Absorption spectrum of PTZ crystals showing two distinct absorptions at 242 and 330 nm.

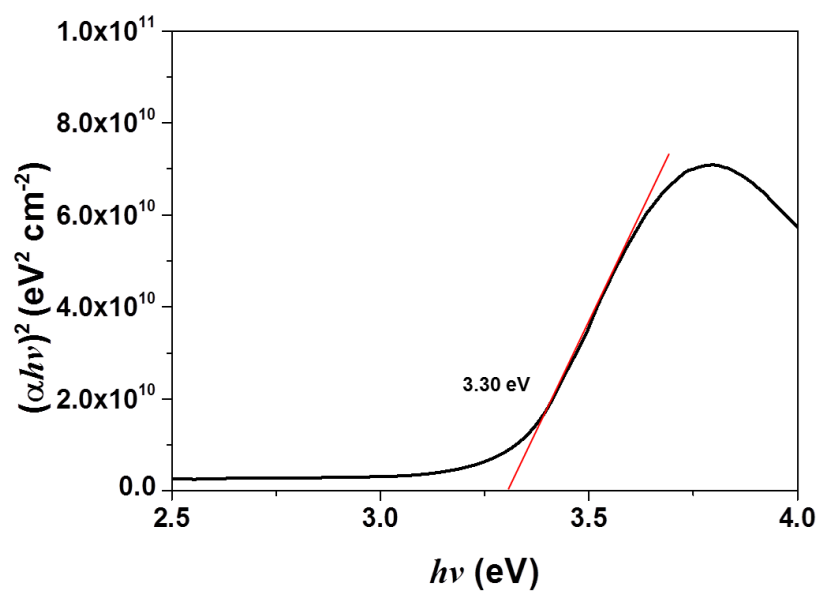


Figure S7. Plot of $(\alpha h\nu)^2$ versus $h\nu$ for PTZ disk crystal.

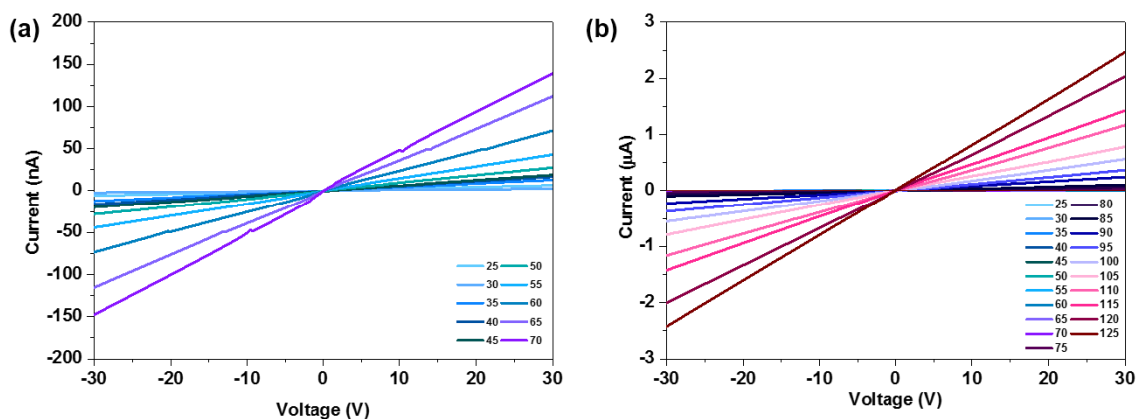


Figure S8. (a) I_{DS} - V_{DS} curves from a PTZ single crystal FET device measured at temperatures from 25 to 70 °C. (b) I_{DS} - V_{DS} curves from PTZ powder pellet device measured at temperatures from 25 to 125 °C.

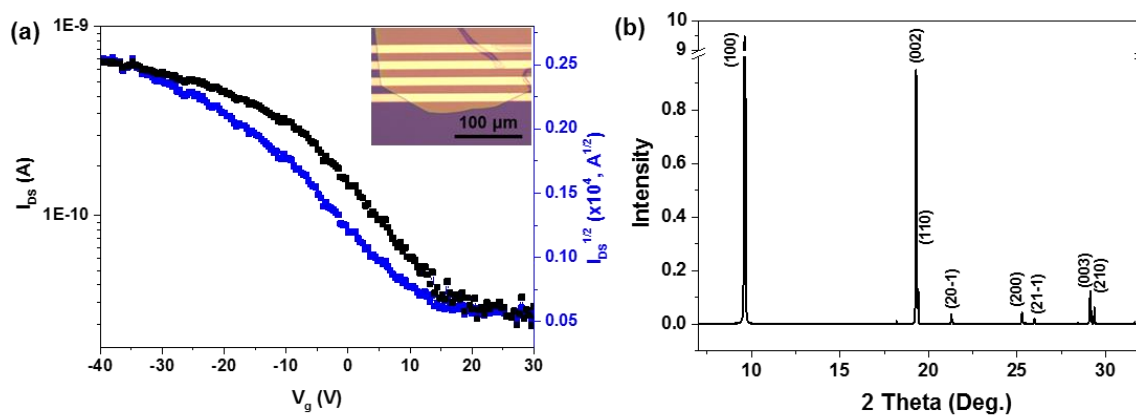


Figure S9. (a) I_{DS} - V_G curve of anthracene 2D crystal FET device showing carrier mobility of $1.69 \times 10^{-6} \text{ cm}^2/\text{V}\cdot\text{s}$ (length/width ratio = 0.5, $V_{DS} = 40 \text{ V}$). (b) XRD data of anthracene crystals