

Supporting Information

Spectroscopy of Discrete Vertically Oriented Single-Crystals of N-Type Tetraazaterrylene: Understanding the Role of Defects in Molecular Semiconductor Photovoltaics

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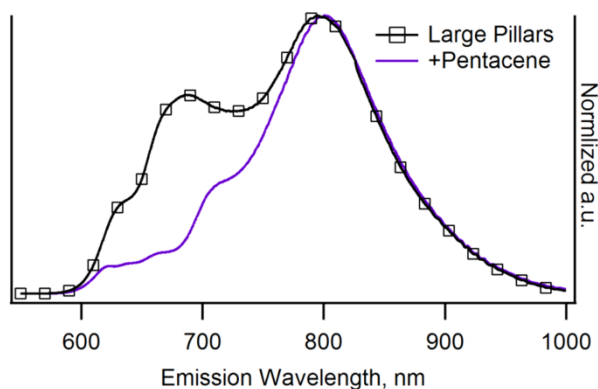


Figure S1. Addition of a pentacene overlayer strongly quenches the ‘pristine’ exciton emission of TAT while leaving the ‘defect’ emission band at 800 nm relatively unchanged.

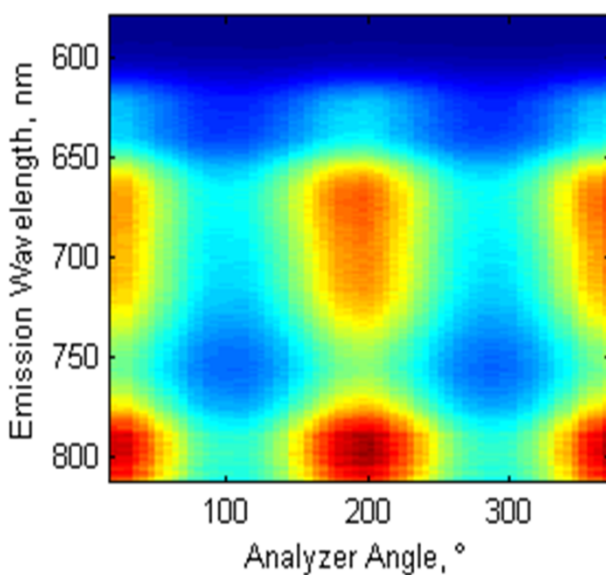


Figure S2. Rotation of an analyzer in the emission path of strongly ‘defect’ emissive TAT pillars shows similar modulation of both the ‘pristine’ and ‘defect’ bands. No dichroic filter was used for this measurement, and the excitation method was changed from epi- to transmission.

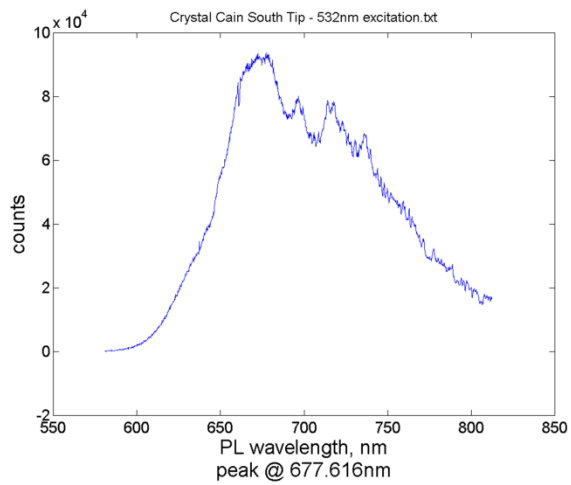
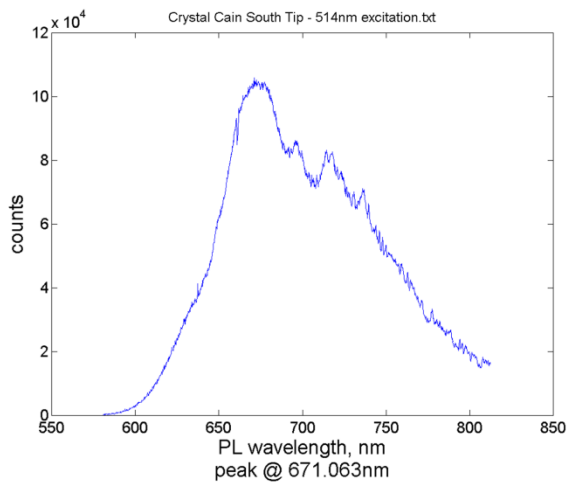


Figure S3. Excitation of a single 'pristine' TAT micro/nano-crystal with continuous-wave 514nm excitation (left) and pulsed 523nm excitation (right, duty 10^{-4}) at equal average power shows no evidence of stimulated emission

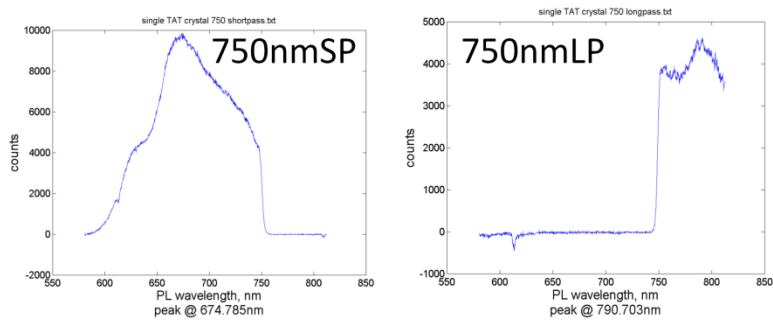


Figure S4. 750nm shortpass (left) and longpass (right) filters allow rough separation of widefield PL into two channels corresponding to the ‘pristine’ emission band (left) and defect emission band (right). Combining these two images in false-color mode allows fast spatial mapping of PL from heterogenous structures.

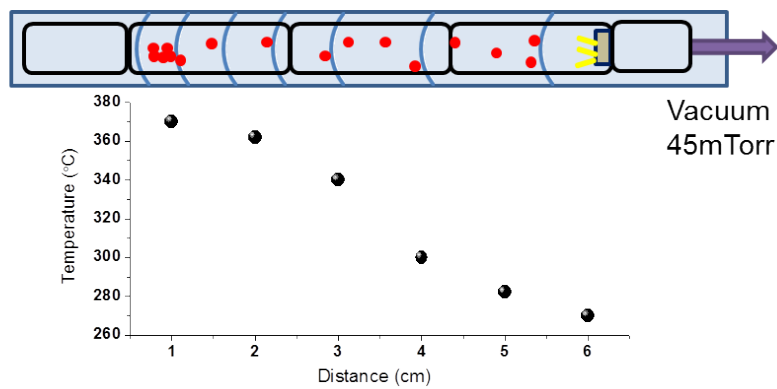


Figure S5. Schematic representation of physical vapor transport system for defect-free TAT micropillars growth. Sublimation zone is 6 cm away from substrate, which is placed perpendicular to the vapor flow direction with 45mTorr vacuum level. Below curve shows the temperature profile along the distance from source to substrate.

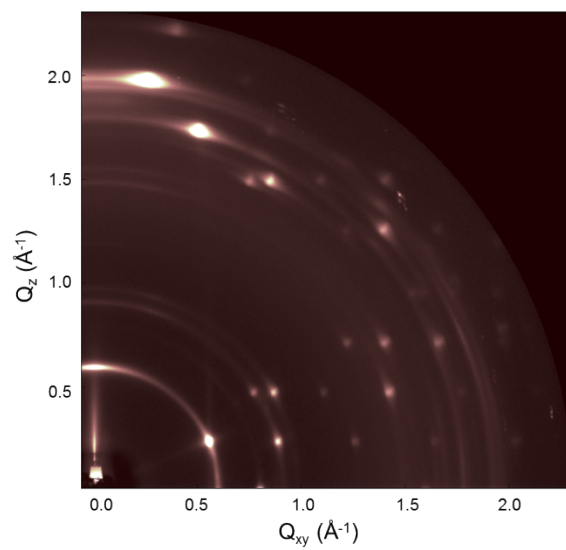


Figure S6. Typical GIXD image of vertical oriented TAT nanowires.