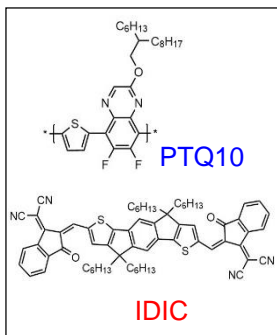


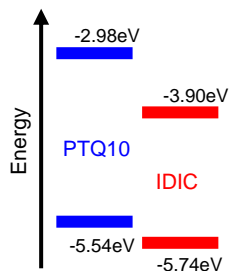
# Free Charge Generation via CT States in a Highly Crystalline NFA-based Organic Solar Cells

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## Chemical Structure

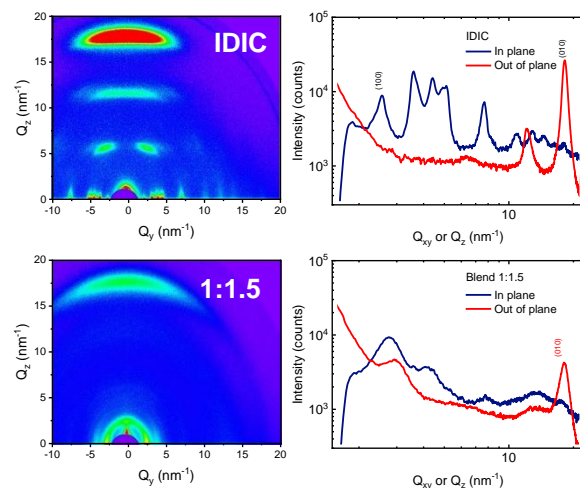


## Energy level



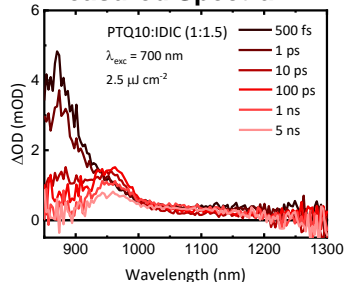
- A high overall product yield of 87.4% with only two synthetic steps from the commercial intermediate
- favours the formation of face-on orientation, close  $\pi$ - $\pi$  stacking, and high crystallinity

## GIWAXS

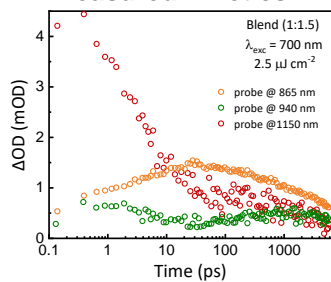


- PTQ10: random lamellar structure,  $\pi$ - $\pi$  stacking
- IDIC: high crystallinity, strong  $\pi$ - $\pi$  stacking
- IDIC coherence length of 8.2 nm in blend

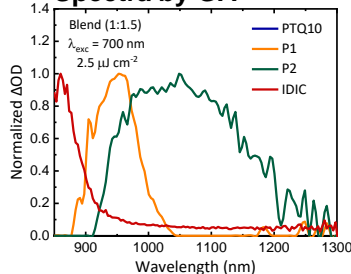
## Measured Spectra



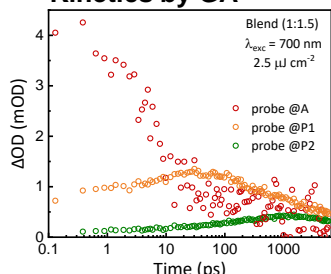
## Measured Kinetics



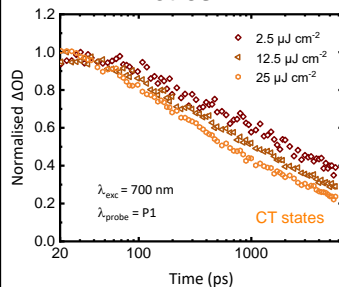
## Spectra by GA



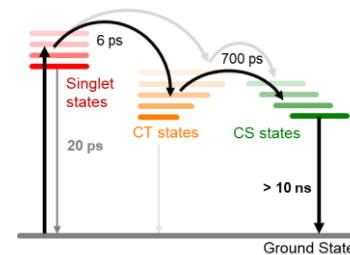
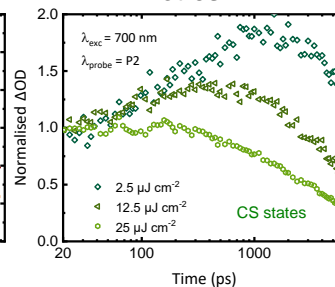
## Kinetics by GA



## P1 Kinetics



## P2 Kinetics



- P1: less fluence dependent – weakly bound charge transfer (CT) state
- P2: strong fluence dependent – bimolecular recombination – charge separation (CS) state
- PTQ10:IDIC show efficient free charge generation via CT states