

Supporting information for:

Single crystal n-channel field effect transistors from solution-processed silylethynylated tetraazapentacene

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Experimental

Measurements: The photo images were collected with an Olympus BH2-UMA optical microscope. AFM images were collected with a Digital Instruments Nanoscope III in tapping mode. X-Ray diffraction (XRD) patterns were collected with a Siemens D5005 X-ray diffraction system (CuK α radiation, $\lambda = 1.54056 \text{ \AA}$). TEM images and SAED patterns were collected out on a Tecnai G² 20ST transmission electron microscopy instrument.

Device fabrication and electrical characterization: The SiO₂/Si substrate was a low resistance n-type Si wafer with 300 nm-thick SiO₂ layer (capacitance of 11 nF/cm²). After rinsed with water, acetone and iso-propanol and cleaned with oxygen plasma, they were modified with n-octadecyltrimethoxysilane (OTMS) following reported procedures.^[1] Single crystals of TIPS-TAP were grown directly onto the OTMS treated SiO₂/Si substrates by drop-casting solutions of TIPS-TAP in toluene/ethanol (10 mg in 1 mL toluene and 1 mL ethanol) or toluene/acetonitrile (10 mg in 1 mL toluene and 0.4 mL acetonitrile). The crystallization was allowed to occur under an ambient atmosphere in the case of toluene/ethanol solution, and under an atmosphere of acetonitrile in the case of toluene/acetonitrile. FET devices were fabricated by gluing Au or Ag films onto single crystals as drain/source electrodes on a Wentworth LABS micromanipulator probe station. I-V measurements were conducted with a Keithley 4200 semiconductor analyzer and a JANIS ST-500-4TX micromanipulator probe station at room temperature under vacuum.

[1] Y. Ito, A. A. Virkar, S. Mannsfeld, J. H. Oh, M. Toney, J. Locklin and Z. Bao, *J. Am. Chem. Soc.*, 2009, **131**, 9396.

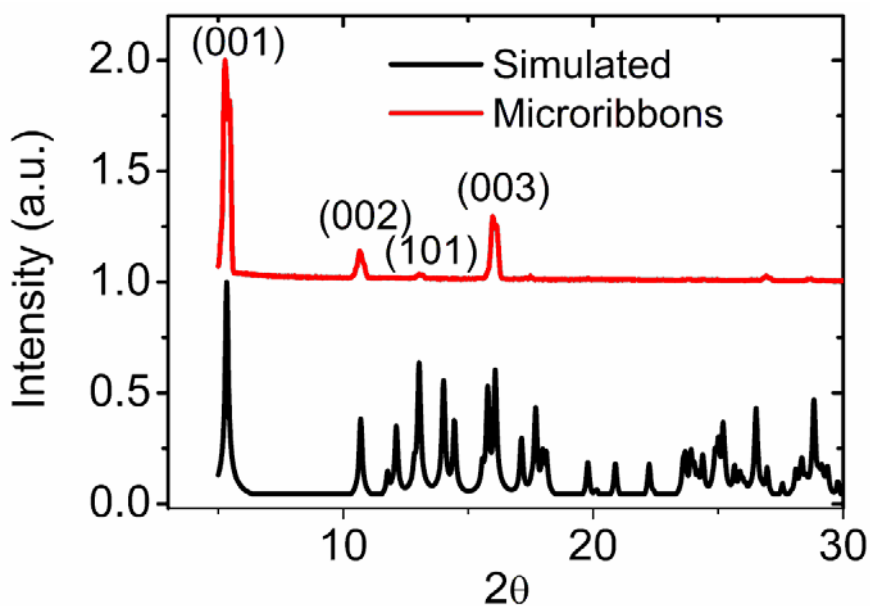


Figure S1. XRD patterns as collected from microribbons of solution-processed TIPS-TAP and as simulated from the single crystal structure.

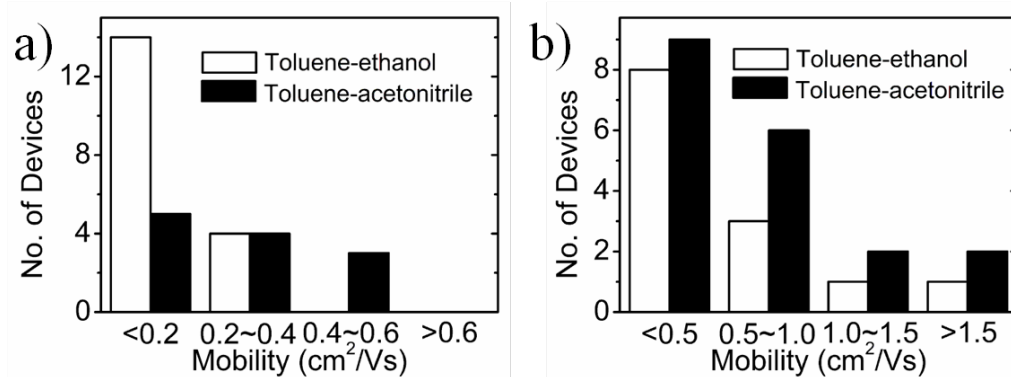


Figure S2. The statistics of measured field-effect mobilities of devices based on a) Au-Au contacts and b) Ag-Ag contacts.

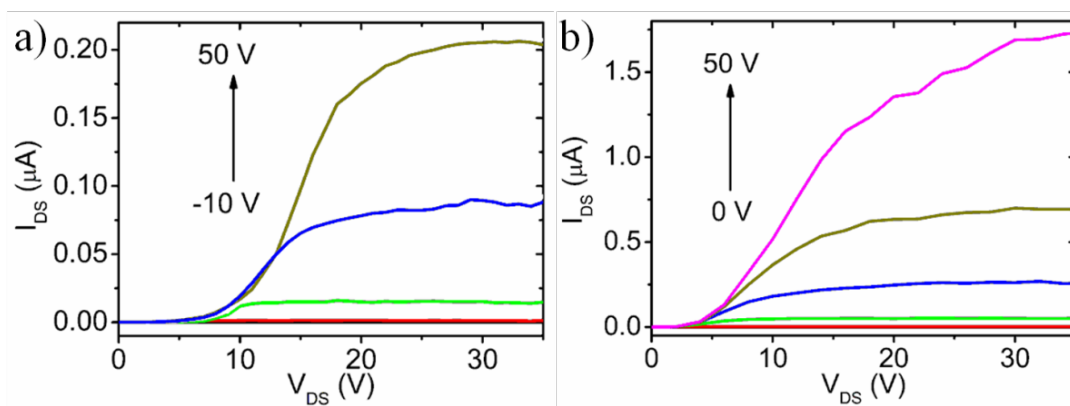


Figure S3. Typical output curves of devices with a) Au-Au contacts and b) Ag-Ag contacts.