In-plane Isotropic Charge Transport Characteristics of Single-Crystal FETs with High Mobility Based on 2,6-bis(4-methoxyphenyl)anthracene: Experimental Cum Theoretical Assessment

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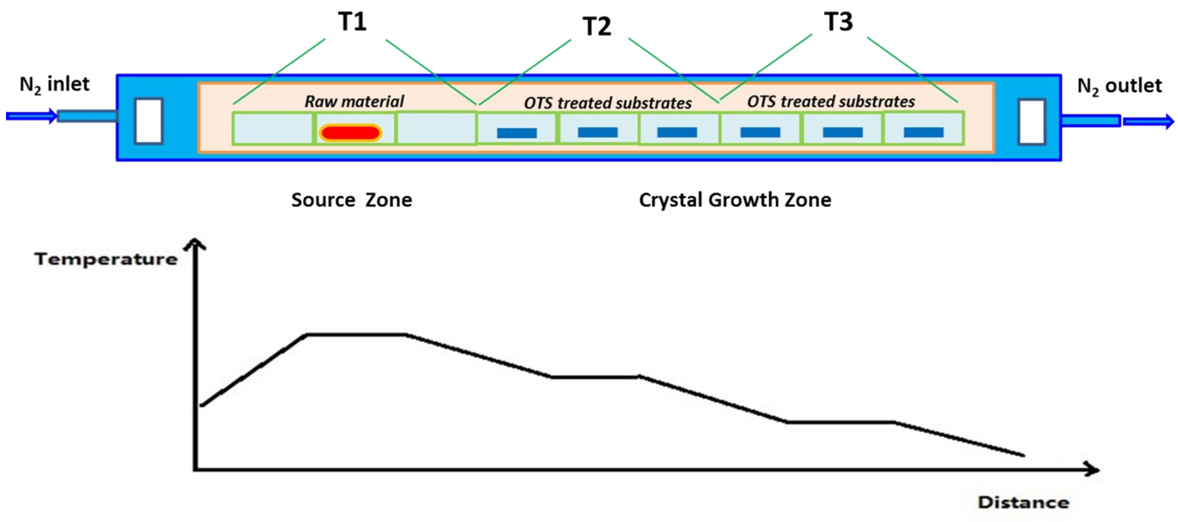
Organic Semiconductor	Single-crystal growth method	Mobility (cm^2/Vs)	Ratio of μ_{max}/μ_{min}	Dielectric layer
DNTT[1]	Physical vapour transport	9.4	1.3~1.7	air
DPVAnt[2]	Physical vapour transport	4.3	1.5~1.95	SiO_2
DPA[3]	Physical vapour transport	34	1.46	SiO_2
ditBu-BTBT[4]	Physical vapour transport	17	1.14[b]	SiO_2
DBTTT[5]	Physical vapour transport	13.87±2.34[a]	--	SiO_2

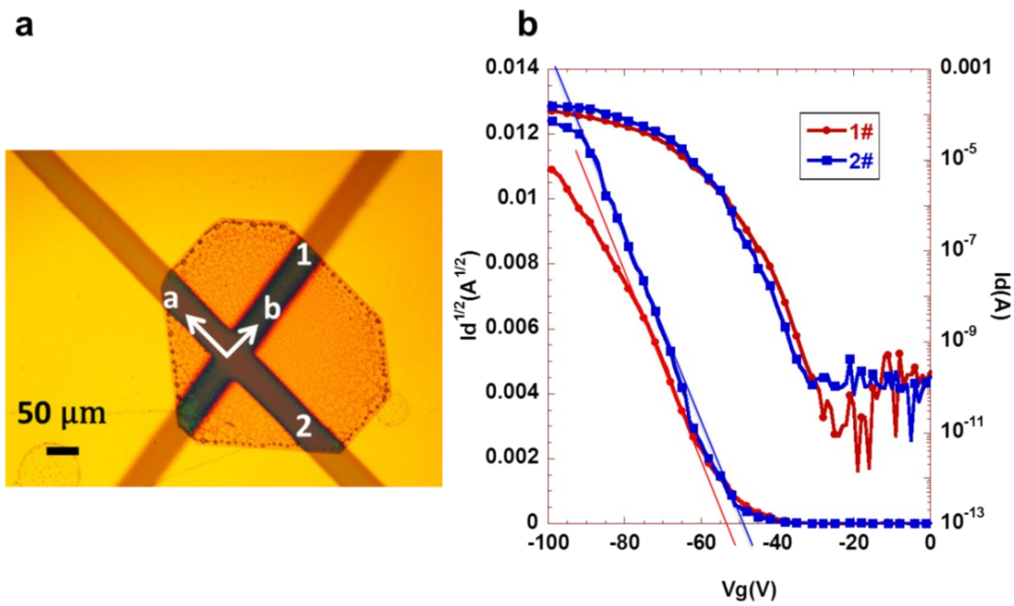
[a] extracted from thin-film TFT;

[b] obtained from calculation.

Supporting Information Table S1. Isotropic charge transport (Weak anisotropic charge transport) in single-crystal FETs.



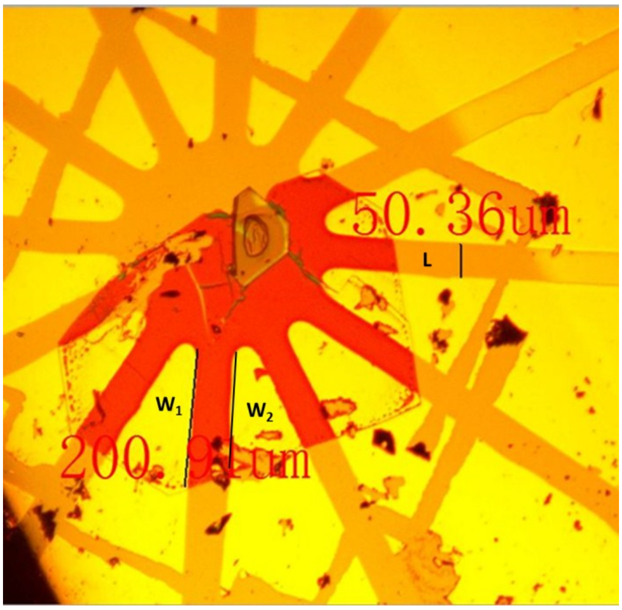
Supporting Information Figure S1. Diagram of the three-zone, physical vapour transport, single-crystal growth instrument used in this work.



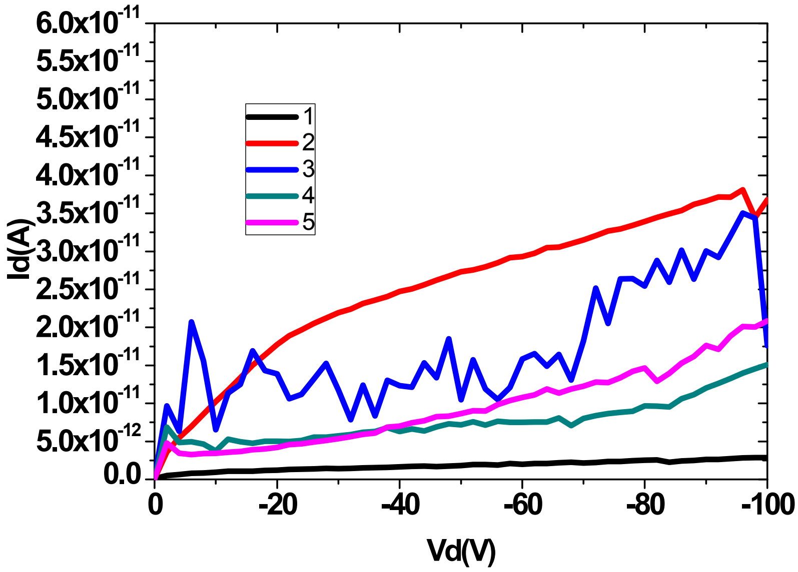
Supporting Information Figure S2. Single-crystal FET with gold wires used as the shadow mask. a) A polarized optical micrograph of a device and b) transfer characteristic curves of devices 1# and 2#. The transfer curves were measured under V_d = -80 V.

Device	Mobility (cm^2/Vs)	V_{th} (V)	On/off ratio
1	4.84	-53	1.42×10^7
2	6.03	-53	7.11×10^6

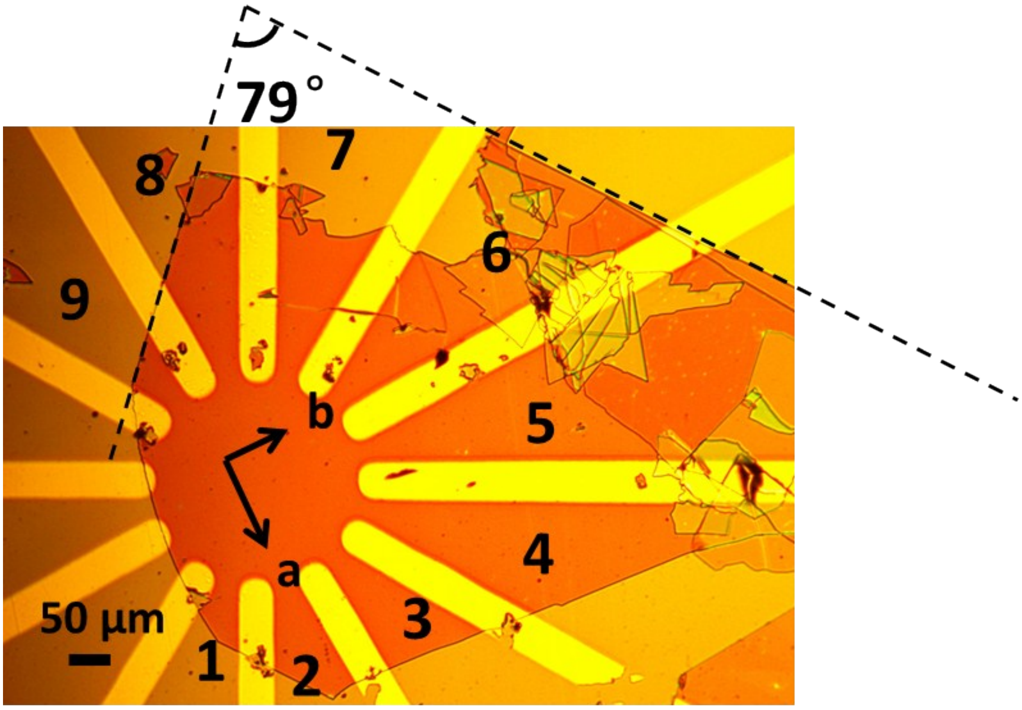
Supporting Information Table S2. Performance of devices #1 and #2 (μ_2/μ_1=1.24).



Supporting Information Figure S3. Polarized microscope picture of the device and the W and L measurement using the POM's software. W is determined as $W = (W_1+W_2)/2$.



Supporting Information Figure S4. I-V curves without Vg (Vg=0).



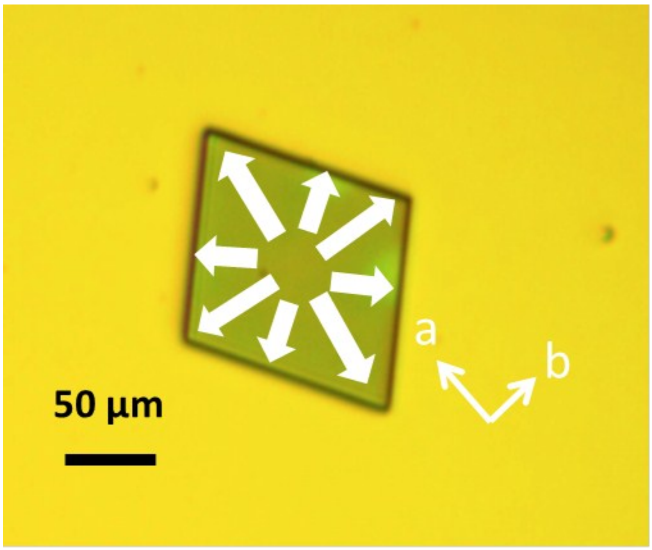
Supporting Information Figure S5. Large single-crystal FETs with another type of shadow mask.

Device	Mobility (cm^2/Vs)	Vth (V)	On/off ratio
2	2.05	-60	2.7×10^5
3	1.99	-55	2.96×10^6
4	2.90	-60	1.38×10^6
5	2.50	-62	1.34×10^6
8	2.13	-58	3.8×10^5

Supporting Information Table S3 Performance of devices with another kind of shadow mask; according to the cosines law, the L/W of each device was determined to be 0.27.

	Transfer integral (eV)	**Reorganization energy (eV)**	**Distance (cm)**	**Hole mobility (cm^2/Vs)**
P	0.013	0.2491	6.16E-08	6.59E-04
T_1	0.073	0.2491	4.83E-08	3.54E-01
T_2	0.073	0.2491	4.83E-08	3.54E-01

Supporting Information Table S4 Mobilities for the integrals P, T_1 and T_2, calculated according to the Marcus–Levich–Jortner simulations.



Supporting Information Figure S6. Typical parallelogram shape of a single crystal grown in zone 3.

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