Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

A solvent-free and vacuum-free melt-processing method to fabricate organic semiconducting layers with large crystal size for organic electronic applications

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Single crystal structure of bis-styryl-pyren.

X-ray quality single-crystals of bis-styryl-pyren were grown by slow evaporation of dichloromethane in a mixture of dichloromethane/methanol. A single crystal was mounted on a glass fiber and diffraction data were acquired using a Mo Kα radiation source (λ = 0.71073 Å). Detailed crystallographic parameters are included in **Table S1**. This dye crystallizes in a monoclinic crystal system (C2/c, Z = 4). The molecule is non-planar with a tilt of the pyrene units of 35.57° compared to the central phenyl unit (see below and animation of structure in **Supporting Information**).

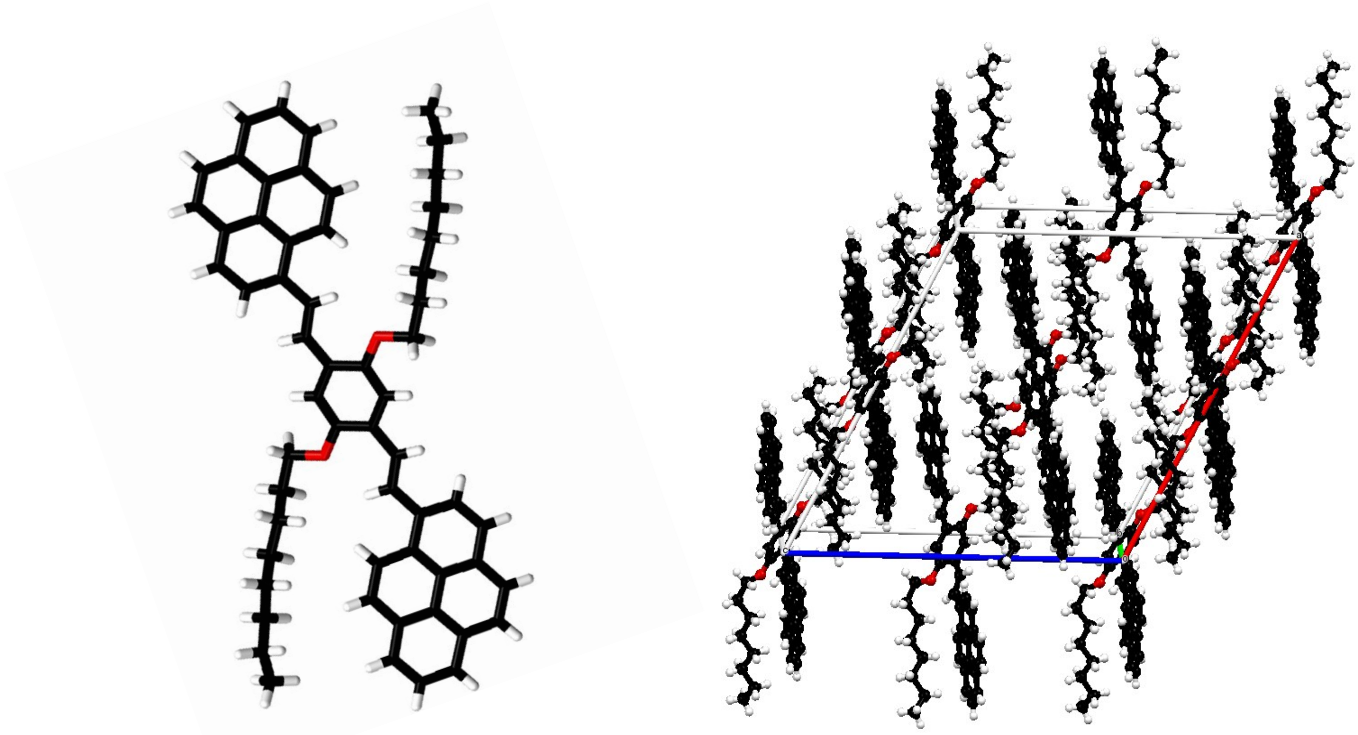

Table S1. Crystal structure data for single crystal of bis-styryl-pyren prepared by slow solvent evaporation.

Compound	
Formula	C58 H58 O2
Molecular weight (g mol^{-1})	787.04
Size (mm)	0.3 x 0.24 x 0.06
Crystal lattice	monoclinic
Space group	C2/c
a [Å]	25.0499(5)
b [Å]	8.3917(2)
c [Å]	23.4363(6)
β	116.997(2)
V [Å^3]	4389.73(19)
ρ_{calcd} (g cm^{-3})	1.191
Z	4
λ(Mo/$K\alpha$) / Å	0.71073
T / K	293(2)
θ range / deg	1.825-27.483
hkl ranges	$0 < h < 32$ $0 < k < 10$ $-30 < l < 26$
Variable	289
Refln measured	34085
Refln $I > 2\sigma(I)$	4995
R1 $I > 2\sigma$ (I)	0.057
R1 all data	0.1241
wR2 $I > 2\sigma(I)$	0.1585
wR2 all data	0.1977
$\Delta\rho$ (+/-) / e. Å^{-3}	0.473 / -0.396

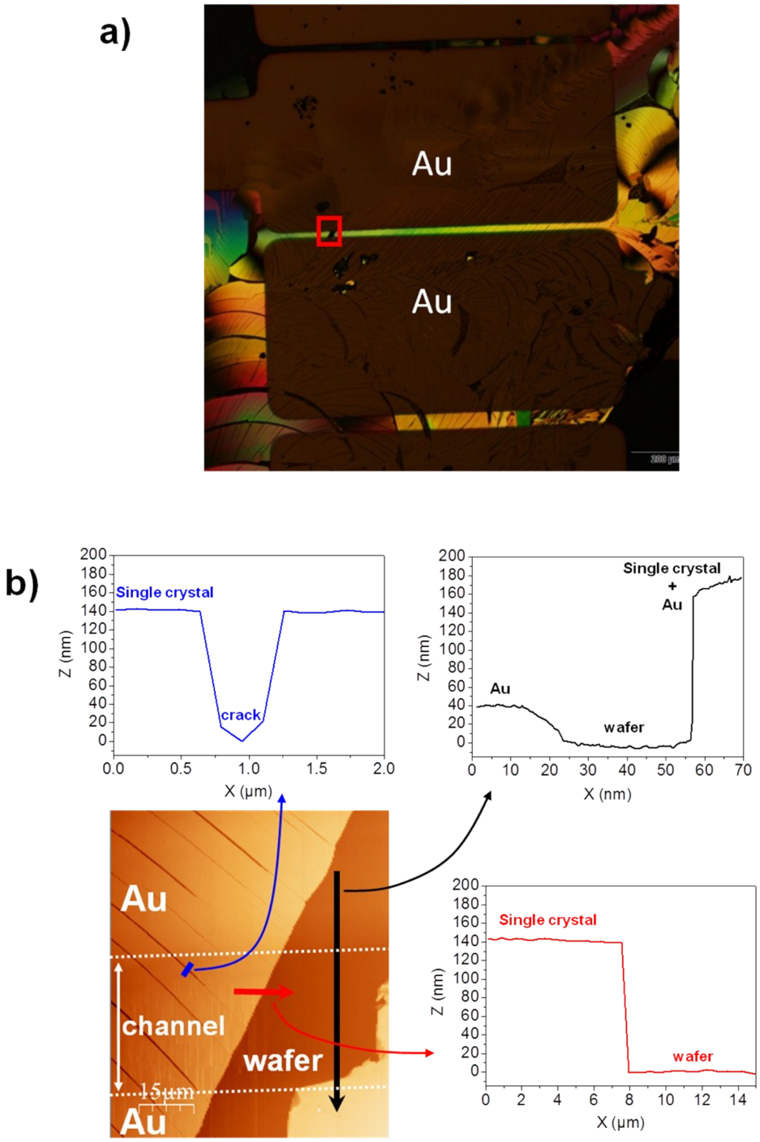

Figure S1

a) Picture of a transistor prepared with a melt-processed thin film of bis-styryl-pyren. b) AFM image of the transistor channel area surrounded by the red square in a), and height profiles along the red, black and blue lines showing the typical melt-processed thin film thickness and the crack depth.

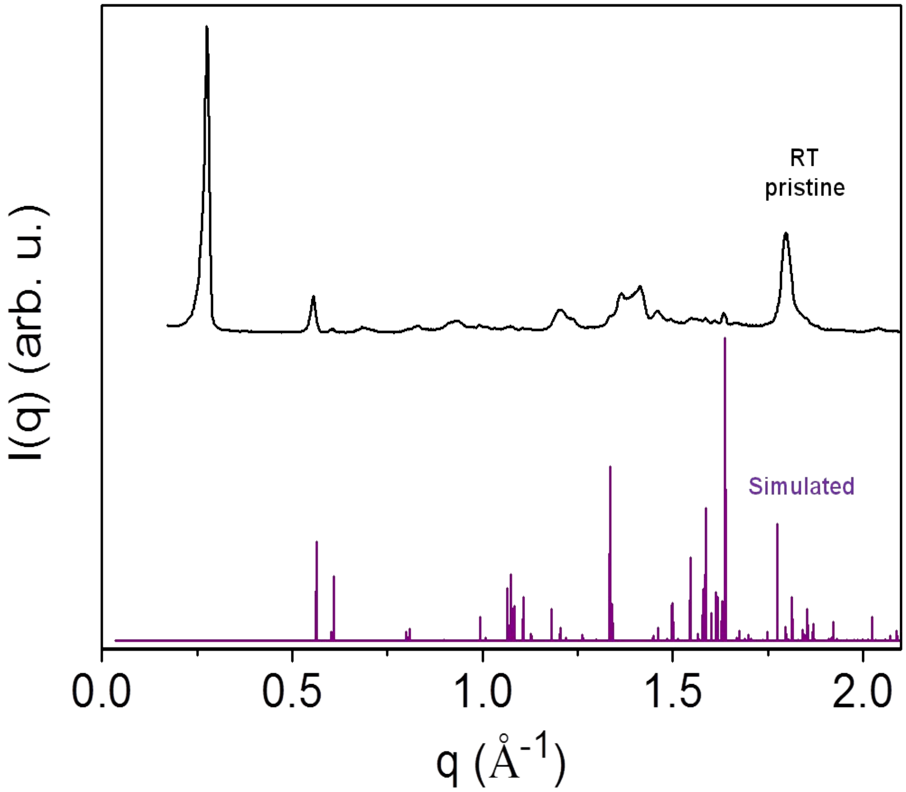

Figure S2

SAXS pattern of bis-styryl-pyren pristine powder and simulated SAXS pattern calculated from crystal structure resolved from single-crystals prepared by slow solvent evaporation.

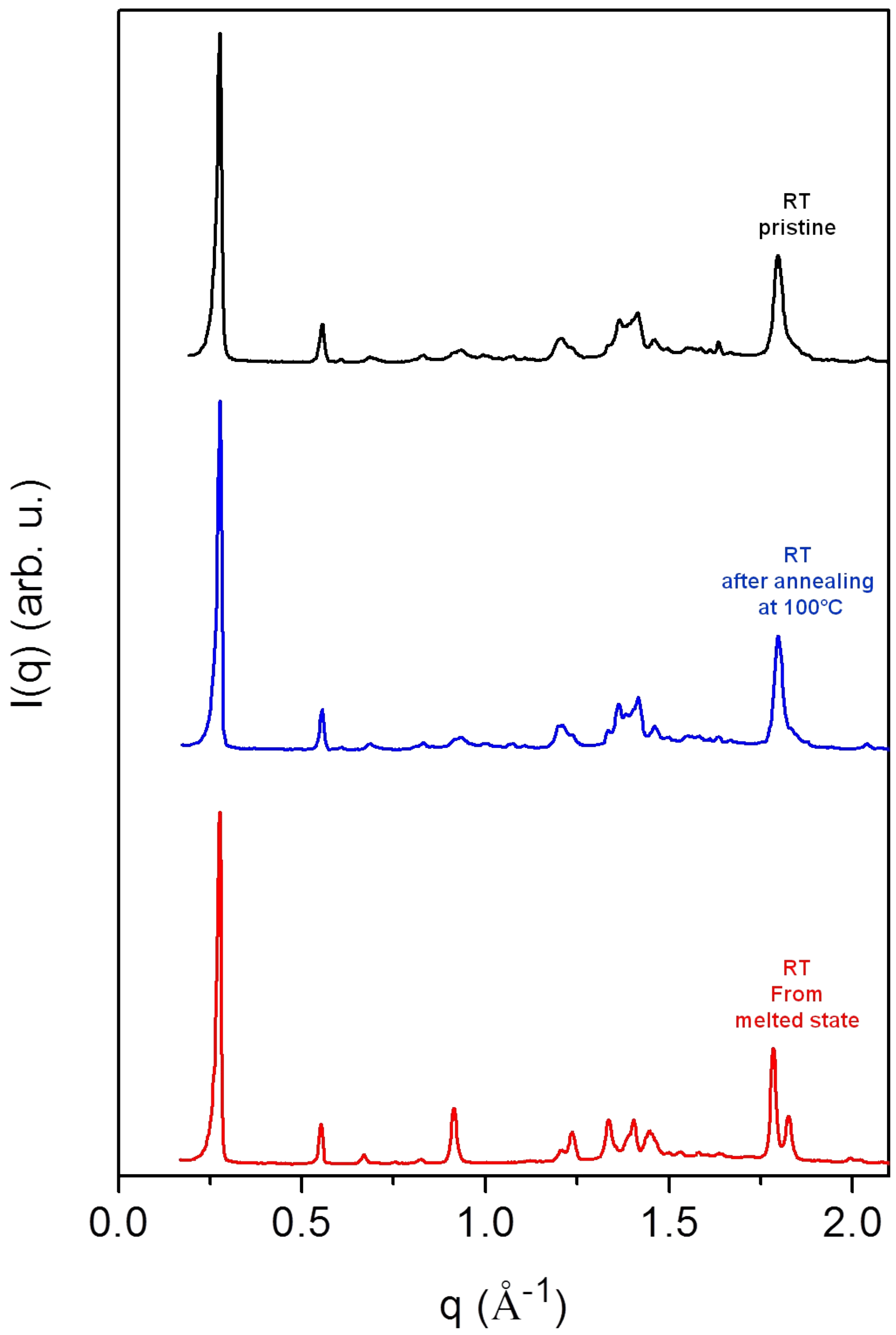

Figure S3

SAXS patterns of bis-styryl-pyren at Room Temperature in the pristine powder state (black), after annealing at 100°C (blue) and after melting in the isotropic liquid phase and cooling (red).

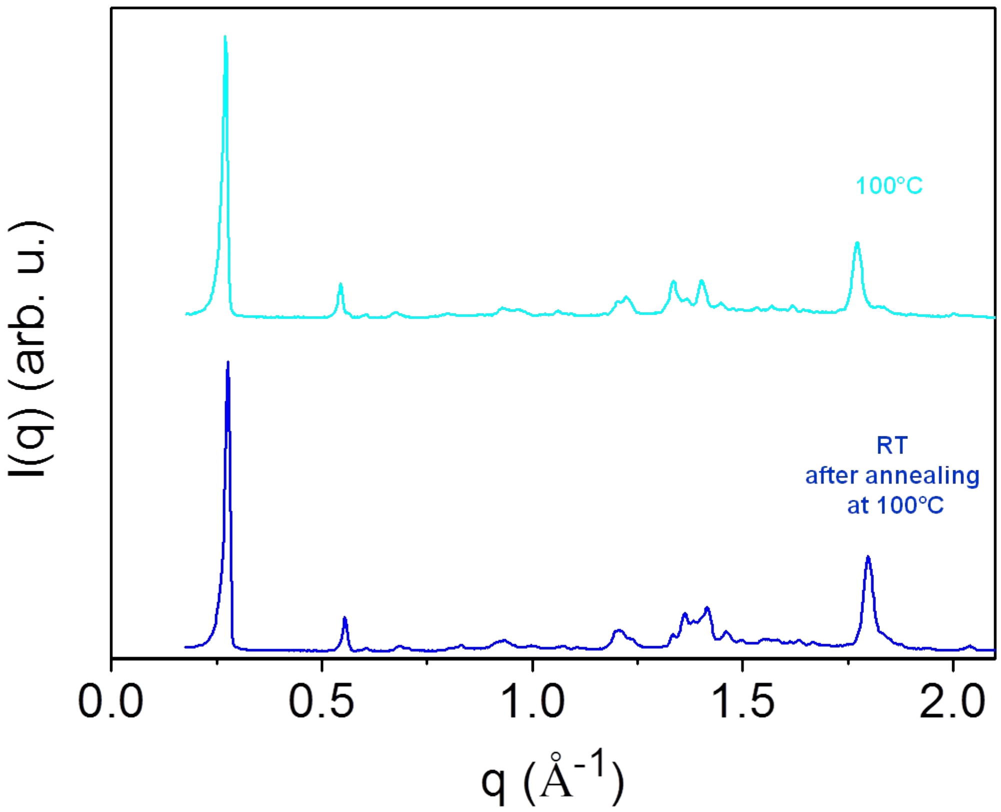

Figure S4

SAXS patterns of bis-styryl-pyren powder at 100°C (sky blue) and at Room Temperature after the annealing at 100°C (blue).

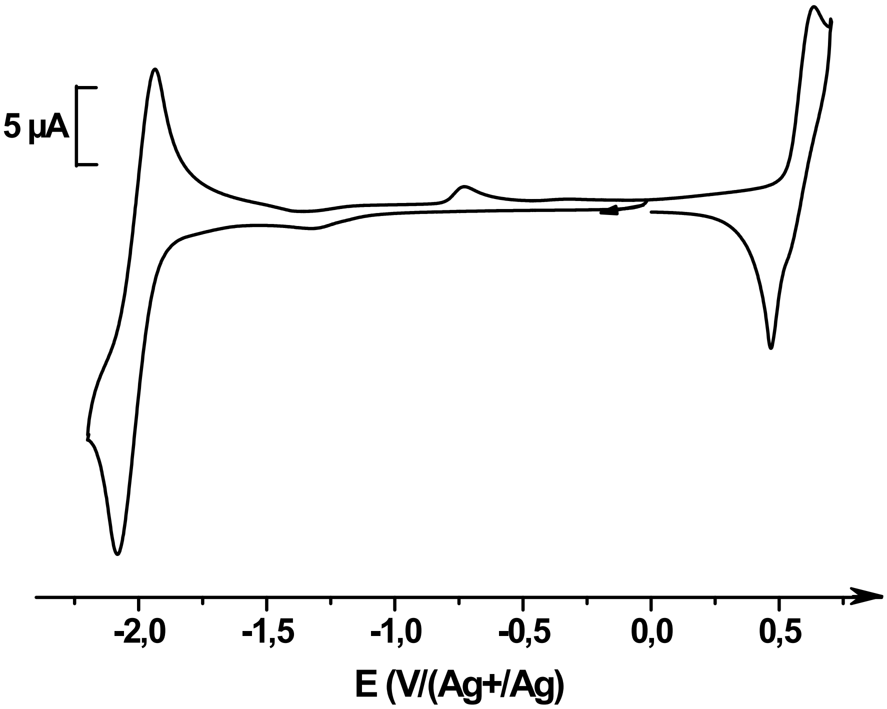

Figure S5

Cyclovoltamogram of a 1M solution of bis-styryl-pyren in THF using TBAPF6 as the supporting electrolyte and a vitreous carbon working electrodes at a rate of 50 mV.s^{-1}.

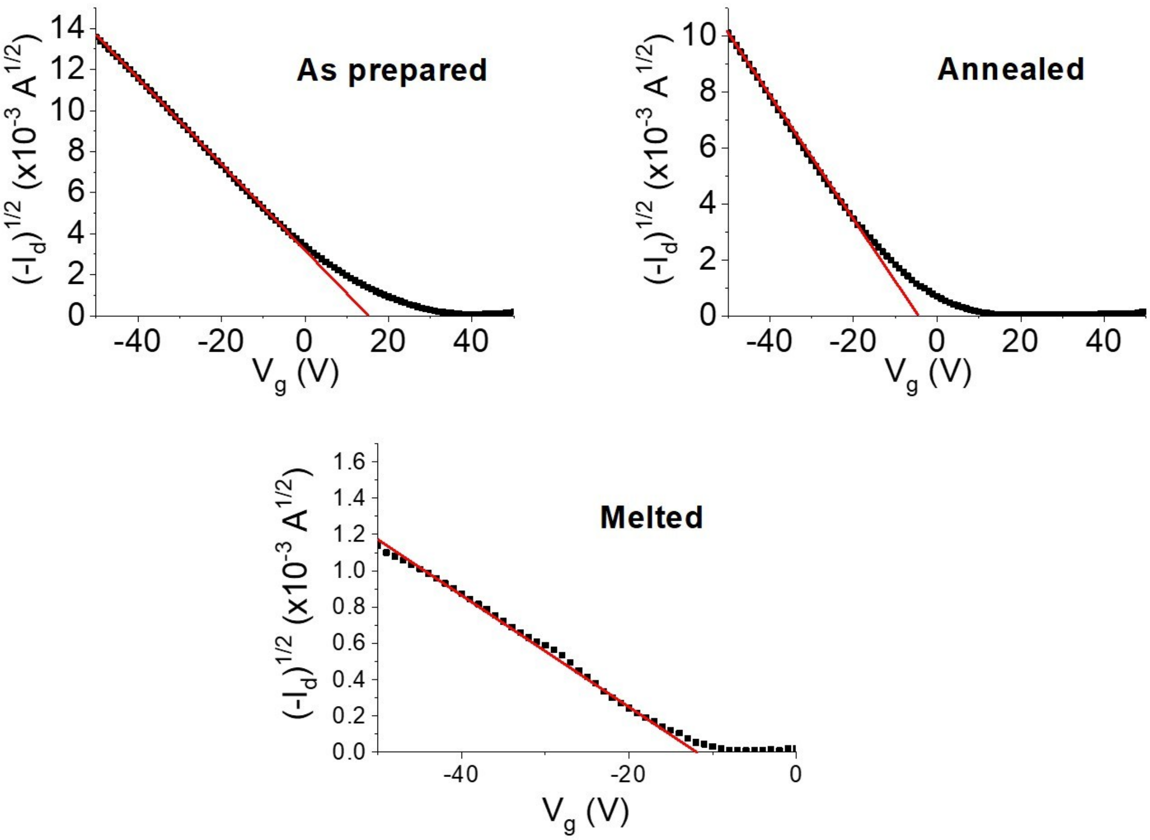

Figure S6

Square root of the s/d current versus the gate voltage in as-prepared, annealed, and melted OFETs.

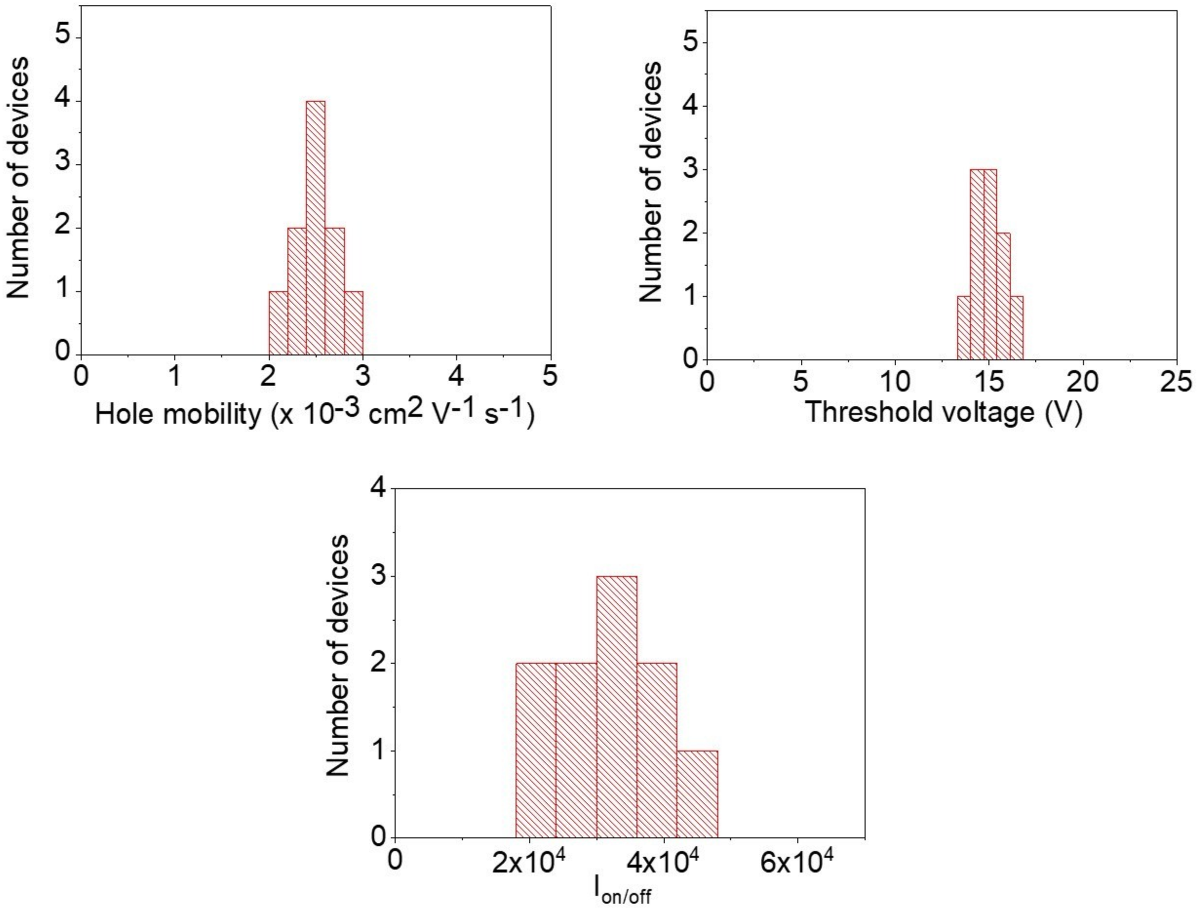

Figure S7

Summary of the OFET properties measured in the as-prepared device. These data show the excellent repeatability of the device performance.

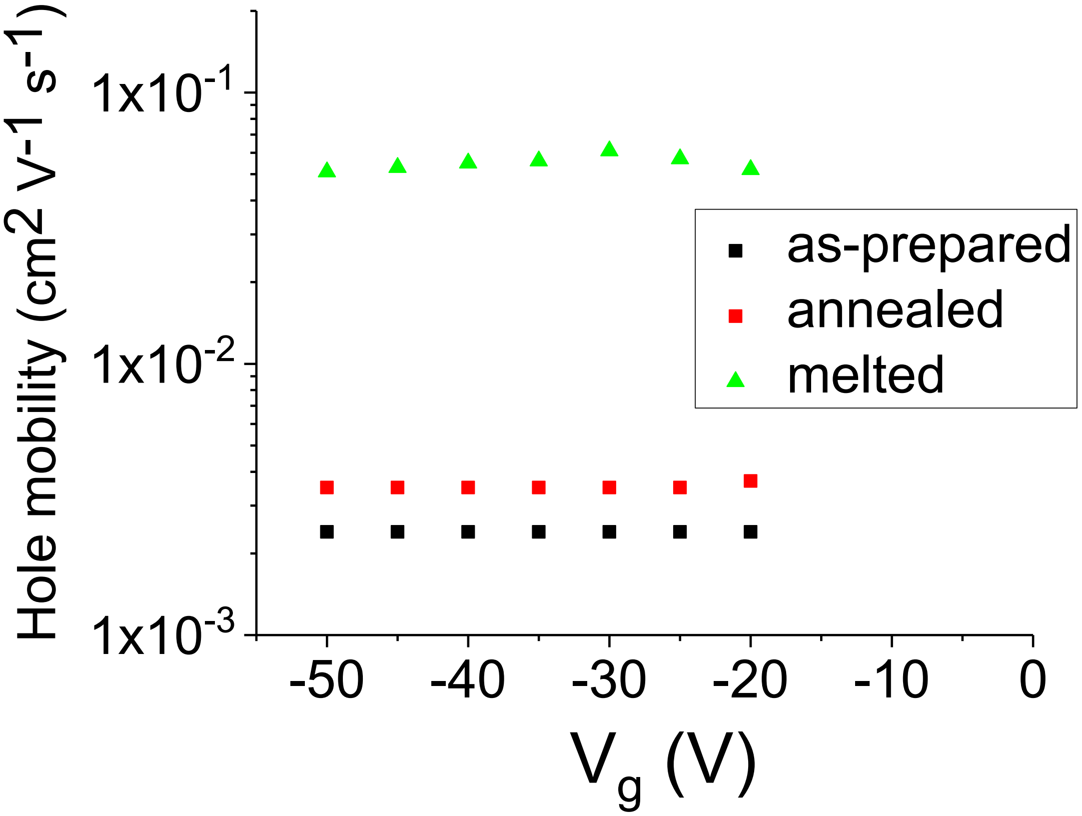

Figure S8

Gate voltage dependence of the hole mobility in representative as-prepared, annealed and melted OFETs. These data indicate that the influence of the contact resistance of the samples on the field-effect mobility determined in the saturation regime is negligible.