

## **Supplementary Material**

# **High Performance Organic Field-effect Transistors of Liquid Crystalline Organic Semiconductor by Laser Mapping Annealing**

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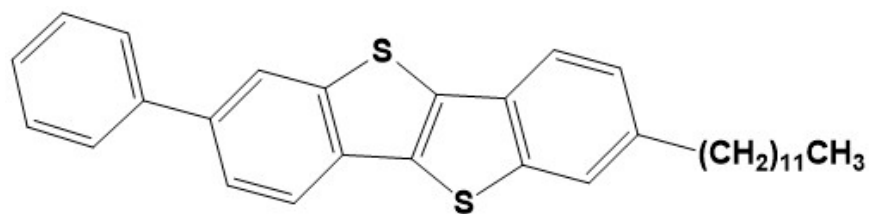
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**Ph-BTBT-12**

3-dodecyl-8-phenylbenzo[*b*]benzo[4,5]thieno[2,3-*d*]thiophene

Chemical Formula: C<sub>32</sub>H<sub>36</sub>S<sub>2</sub>

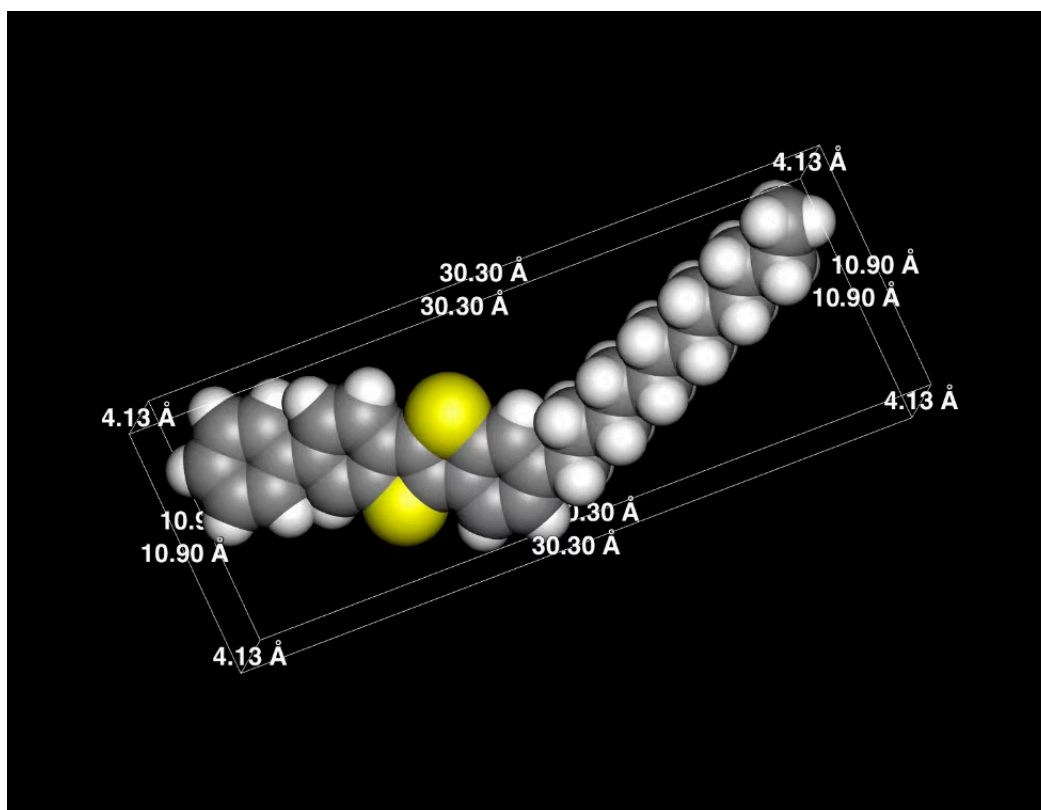
Exact Mass: 484.23

Molecular Weight: 484.76

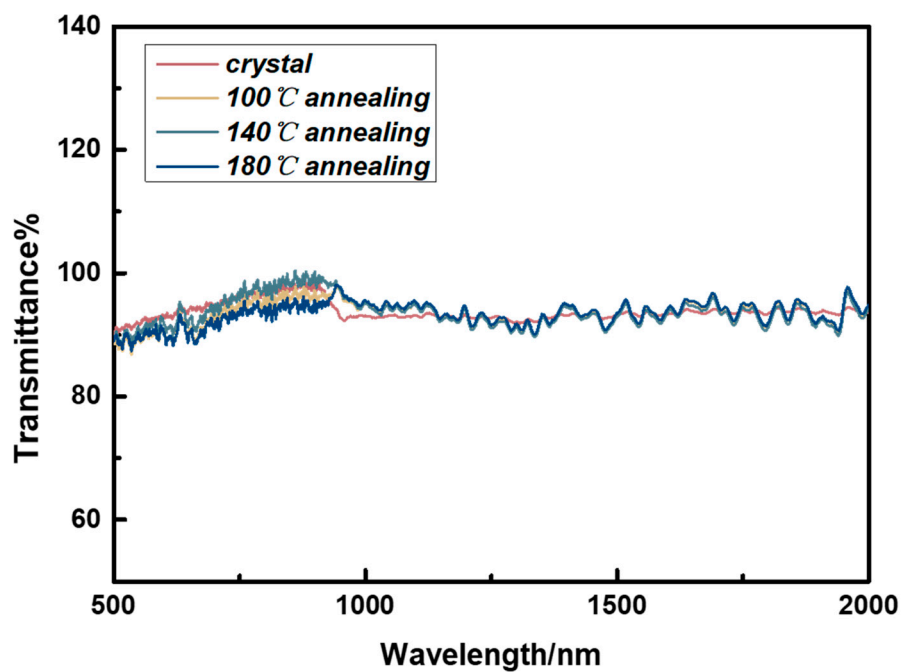
m/z: 484.23 (100.0%), 485.23 (36.6%), 486.22 (9.0%), 486.23 (6.4%), 487.22 (3.2%)

Elemental Analysis: C, 79.29; H, 7.49; S, 13.23

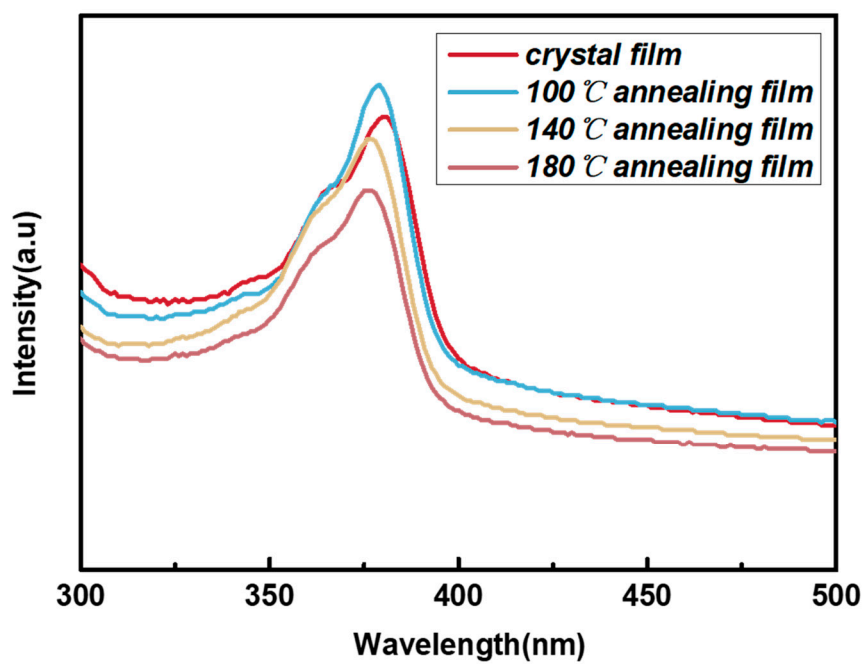
**Figure S1.** Molecular structure of Ph-BTBT-12 material and its related information.



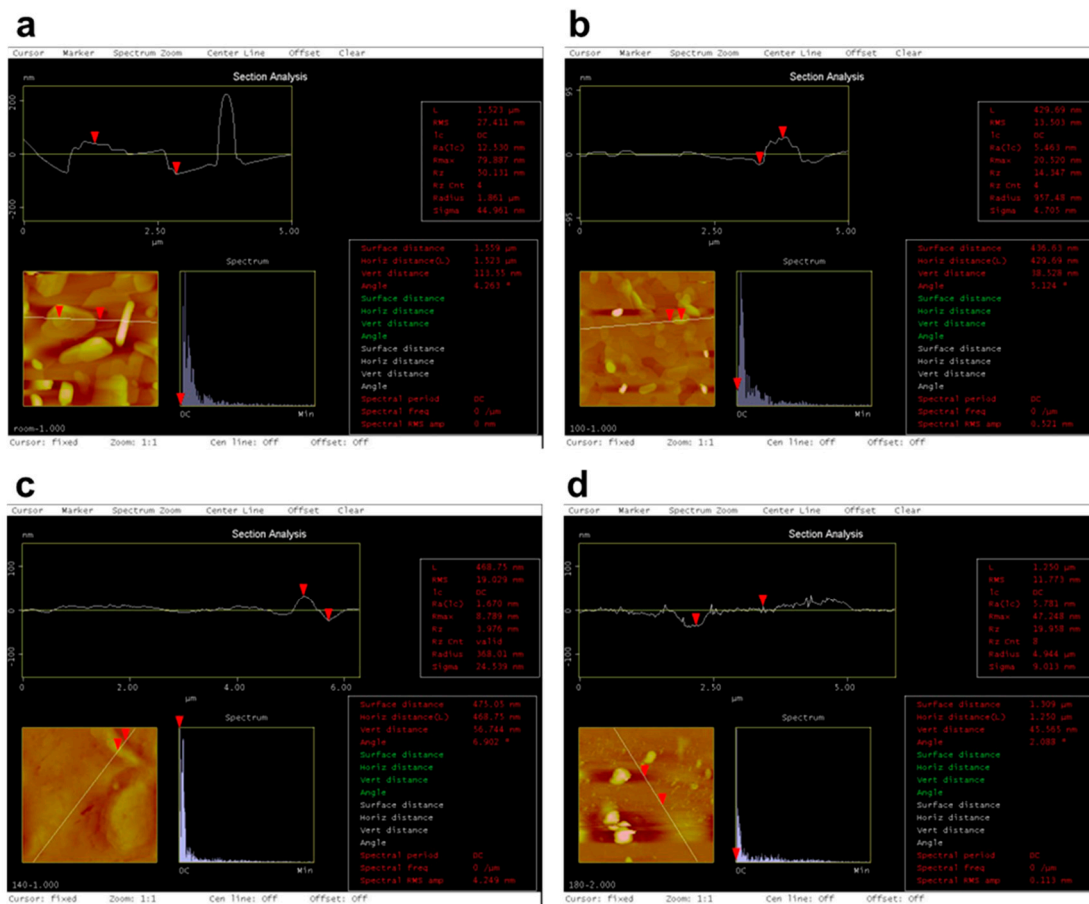
**Figure S2.** Molecular length of Ph-BTBT-12 material calculated by Chem 3D.



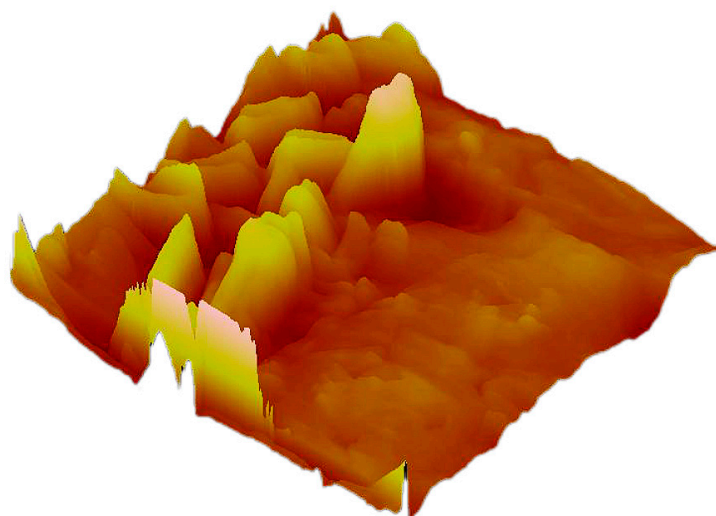
**Figure S3.** Transmittance of Ph-BTBT-12 vaporized on a quartz wafer using thermal vapor deposition and annealed at different temperatures.



**Figure S4.** UV-Visible spectra of Ph-BTBT-12 vaporized on a quartz wafer using thermal vaporization after annealing at different temperatures.

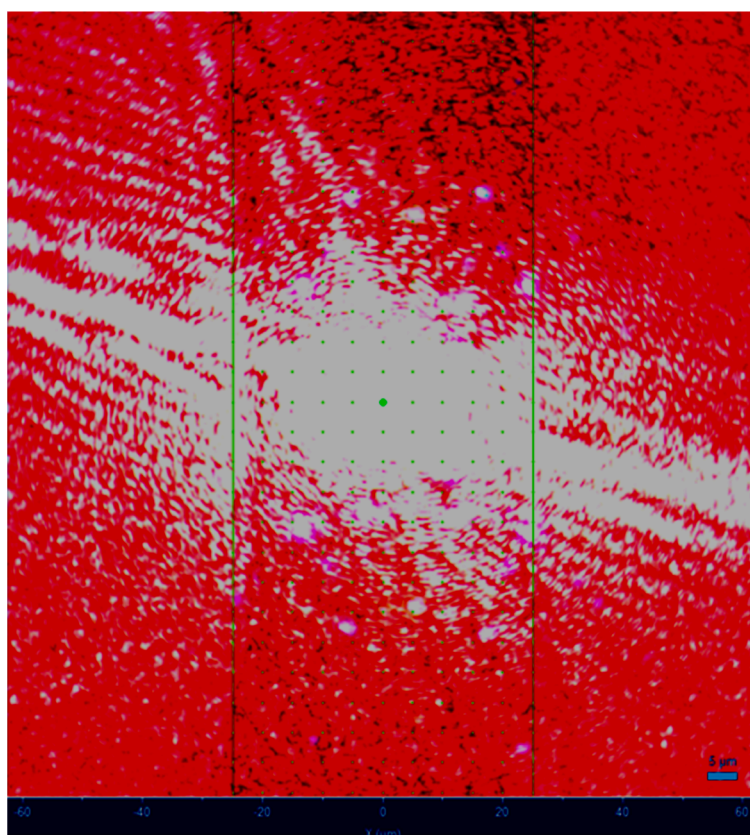


**Figure S5.** Surface AFM images of Ph-BTBT-12 films at different annealing temperatures a) room temperature, b) 100 °C, c) 140 °C, d) 180 °C.

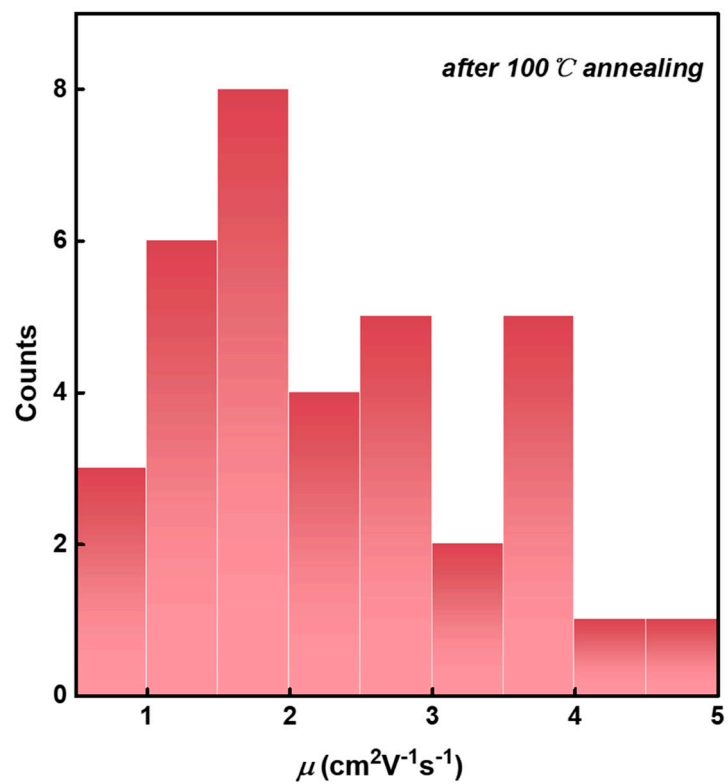


**Figure S6.** 3D AFM images before and after annealing of the material organ at room temperature.





**Figure S7.** Images of the experiment with the laser turned on, and the approximate diameter range of the laser.



**Figure S8.** Histogram of the mobility of devices prepared based on Ph-BTBT-12 as an active layer annealed after 100 °C.