



Liquid crystalline organic semiconductors for flexible devices

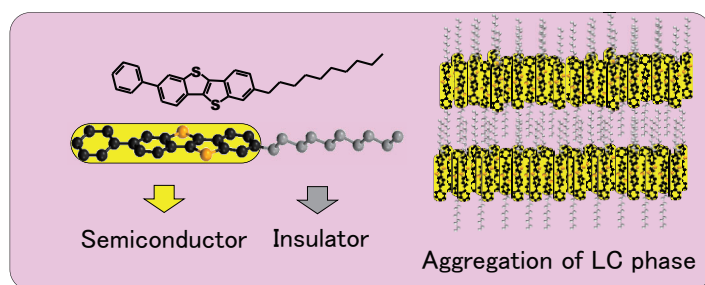
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- Liquid crystalline organic semiconductors
- Quality organic transistors fabricated by solution process

Our research target is the fabrication of quality organic semiconductor thin films on inexpensive plastic substrates by solution process and low process temperature.

Liquid crystals (LCs) have some benefits for fabrication of uniform films, high thermal durability of films, small variation of devices, and high mobility by fabrication of thin films at LC temperature.

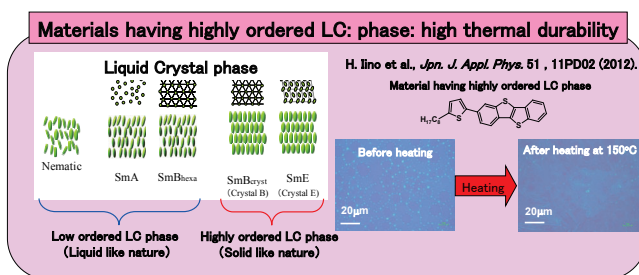
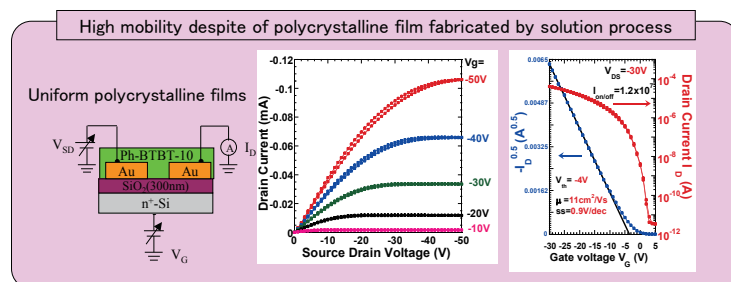
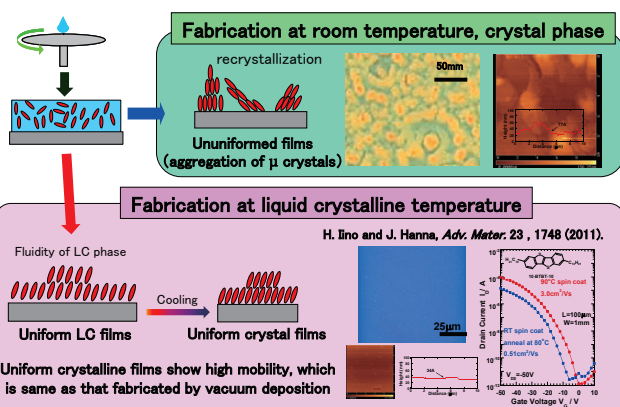


Aggregation of liquid crystalline organic semiconductors

- LC molecule has semiconductor and insulator parts.
- Aggregations of semiconductor part by self-organizing property of liquid crystal.

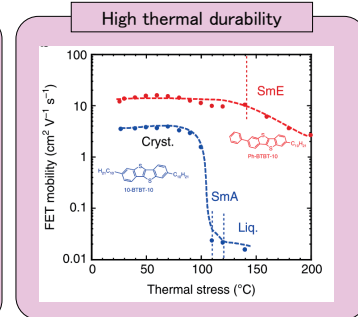
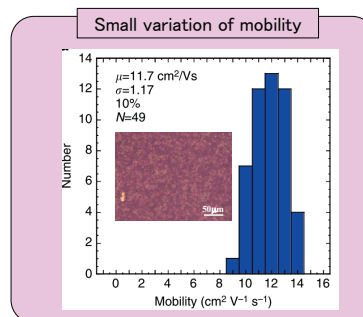


H. Iino, T. Usui, J. Hanna, *Nature Communications*, 6, 6828 (2015).



Liquid crystalline organic semiconductors as quality polycrystalline materials

- Easy fabrication of uniform crystalline thin films by solution process using precursor of uniform LC films
- High durability of thin films using highly ordered LC phase, which has solid like nature.



Transistor characteristic of Ph-BTBT-10

- P-channel operation in bottom-gate bottom-contact type field effect transistor.
- Small variation of mobility in polycrystalline thin films
- High thermal durability after high temperature stress