

論文 / 著書情報
Article / Book Information

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Title(English)	Investigation on formation of bilayer crystal structure in mono-alkyl chain smectic liquid crystalline organic semiconductors-Synthesis, phase behaviors and their application to organic field-effect transistors-
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Dissertation outline

In this research, several serials of mono-alkyl chain smectic liquid crystal organic semiconductors were synthesized to investigate the effect factors on formation of a bilayer crystal structure and clarify that generality on the phenomenon of FET mobility dramatically enhanced by phase transition from a monolayer crystal structure to a bilayer crystal structure, which just found by our group in the case of Ph-BTBT-C10.

After investigation, it found that the bilayer crystal structure could only be formed in mono-alkyl π -conjugated systems. Moreover, delicate balance between the lengths of alkyl chain and the size of π -conjugated core should be carefully optimized.

Furthermore, the FET mobility of mono-alkyl liquid crystal semiconductor featuring bilayer crystal structure was always enhanced when the formation of the bilayer crystal structures by phase transition from the monolayer crystal structures.

The result indicates that the phenomenon of “OFET mobility enhanced by phase transition from monolayer crystal structure to bilayer crystal structure” is NOT a particular case for Ph-BTBT-C10, and would be general for solution-processed OFET devices fabricated with mono-alkyl SmE OFET materials featuring bilayer crystal structure, providing us with a new approach for OFET devices with high FET performance