VIDEO ARTICLE

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Influences of Structure Defects on the Performances of Solution-Processed OFET

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Graphical Abstract

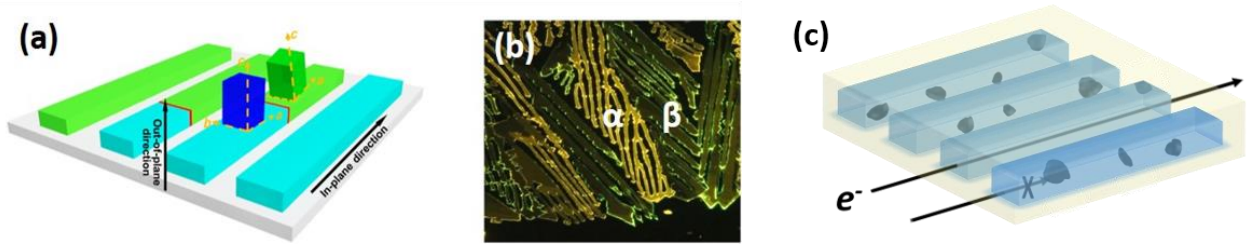

Fig. 1. Illustration of (a) low-angle grain boundary, (b) polymorph, and (c) continuity of crystalline domain in crystal arrays of conjugated molecules

Abstracts

The quality of charge-transport channel strongly affects the performances of organic field-effect transistors (OFET). To achieve higher charge mobility, solution-processed single-crystal (SPSC) techniques have been used to build up crystal arrays of conjugated molecules as effective charge-transport channels [**1**]. Nevertheless, subtle structural defects in the crystal arrays truncate the charge-transport pathway and affect the OFET mobility. In this presentation, characterization procedures to identify the low-angle grain boundary (LAGB) [**2**], polymorphism, and crystallinity [**3**] of the crystal arrays of conjugated molecules will be demonstrated. Following that, the influences of lattice alignment, packing structure and crystallinity on the OFET mobility will be discussed. It was found that (1) unification the lattice orientation and packing structure, and (2) continuity of the crystalline domain play important roles in the performances and reproducibility of the solution-processed OFETs.

References

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Biography of Presenting Author

Chien-Lung Wang received his Ph.D. degree in Polymer Science at the University of Akron in 2011. His Ph.D. research focused on the supermolecular chemistry and optoelectronic properties of the C_{60}–porphyrin derivatives. After spending four months as a postdoctoral assistant in Prof. Xiong Gong's research group at the Department of Polymer Engineering, University of Akron, he joined the Department of Applied Chemistry, National Chiao Tung University, in 2011 as an Assistant Professor. He was promoted to Associate Professor in 2015 and to Professor in 2019. His current research focuses on the structure–property relationship, morphological engineering and supramolecular chemistry of conjugated molecules and self-organized functional materials.

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