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**The Role of Aromatic Structural Units of Conjugated Copolymers in Reaching High Solid-State Order and Optoelectronic Performances**[1] CHIEN-LUNG WANG, CHAIN-SHU HSU, KUAN-YI WU, TIEN-HSIN LEE, Department of Applied Chemistry, National Chiao Tung University — Solid-state order of conjugated polymers is determinative in converting molecular properties into useful optoelectronic performances. The rapid development in donor-acceptor conjugated copolymers not only prompted device performances of polymeric optoelectronics, but also created wide varieties of complicate aromatic structural units, whose role in the solid-state order remains under studied. The roles of two widely used axisymmetrical aromatic units- 5,6-difluorobenzo-2,1,3-thiadiazole, and dithienocyclopentacarbazole will be discussed in this presentation. 2-dimensional X-ray diffraction, electron diffraction and theoretical molecular simulation showed that ordered solid-state structures were reached in copolymers with strong interchain interaction and good backbone linearity. The enhanced interchain interaction was supported by higher melting temperature and dis-aggregation temperature in the solution. High mobility of 0.29 cm2/Vs and power conversion efficiency of 6.82% were reached in copolymers possess ordered solid-state structure with long correlation lengths.

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