

Structure–property relationship of n-type polymer semiconductors for organic field–effect transistors

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Polymer semiconductors have been considered as key materials for low-cost flexible electronics. However, materialization of plastic electronics with the promised properties has been delayed due to the scarcity of reliable high-mobility n-type polymer semiconductors. In this talk, I present my recent work on n-type polymer semiconductors as an active component of organic field-effect transistors. A series of donor-acceptor polymer semiconductors are designed and studied in detail with an emphasis on relationships between molecular structure and charge transport property. Systematic studies resulted in the demonstration of high-performance transistors with a polymer semiconductor showing an electron mobility of 0.3 cm²/Vs. In the last part, I briefly discuss an outlook of stability and durability of polymer semiconductors to provide one of promising directions for designing highly stable polymer semiconductors.