# Development of High Performance Nonvolatile Floating Gate Memory Transistor with Long Retention Time using CDT-DPP Donor-Acceptor Copolymers

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A series of new donor-acceptor copolymers was synthesized for the aim of simultaneously realizing high field effect mobility and high bias stability. These are based on cyclopentadithiophene (CDT) as a donor and diketopyrrollopyrole (DPP) as an acceptor with additional donor building unit of thiophene (CDT-DPP-T), thiophene-vinylene-thiophene (CDT-DPP-TVT), selenophene (CDT-DPP-S), and selenophene-vinylene-selenophene (CDT-DPP-SVS). Based on systematic analyses on energetic and microstructural features of these new copolymers, we show that CDT-DPP-SVS can be the most fascinating candidate for polymer field effect transistors (PFETs) with high bias stability. CDT-DPP-SVS PFET shows negligible hysteresis and excellent bias stability. Furthermore, to utilize full advantage of electrically robust nature of CDT-DPP-SVS, we demonstrate a floating gate memory transistor with CDT-DPP-SVS as a channel layer, resulting in high on/off current ratio of ~$10^5$ with an operation voltage of 30 V of gate bias, and retention time longer than$10^6$ s.