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Amorphous Dithenylcyclopentadienone-Carbazole copolymer for Organic Thin-Film Transistors[1] E. KANG, Center for Supersolid and Quantum Matter Research, Korea Advanced Institute of Science and Technology, J. YUEN, Center for Polymers and Organic Solids, University of California, Santa Barbara, W. WALKER, Department of Chemistry and Biochemistry, University of California, Los Angeles, N. COATES, S. CHO, Center for Polymers and Organic Solids, University of California, Santa Barbara, E. KIM, Center for Supersolid and Quantum Matter Research, Korea Advanced Institute of Science and Technology, F. WUDL, Center for Polymers and Organic Solids, University of California, Santa Barbara
— We developed a new high performance amorphous donor-acceptor conjugated copolymer consisting dithienylcylclopentadienone subunit as an electron acceptor and carbazole derivative as an electron donor. X-ray diffraction analysis shows no scattering patterns, indicating a disordered amorphous solid is formed. A high on/off current ratio of approximately 10^6 and a high field effect mobility of 2.24×10^{-2} cm^2 $V^{-1}s^{-1}$ were obtained with stable output characteristics. The high performance of the amorphous copolymer is ascribed to the relatively low activation energy and low characteristic temperature obtained from a low temperature transport analysis, reflecting that localization of the charge carrier is not substantial in the film.

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