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Charge transport and velocity distribution in ambipolar organic thin film Transistors based on a diketopyrrolopyrrole-benzothiadiazole copolymer TAE-JUN HA, The University of Texas at Austin, PRASHANT SONAR, SAMARENDRA PRATAP SINGH, Institute of Materials Research and Engineering(A*STAR), ANANTH DODABALAPUR, The University of Texas at Austin — There have been reports of charge transport mechanisms in organic thin film transistors (OTFTs) focusing on steady-state characteristics but these measurements provide limited information. Time-resolved measurements can provide additional information in understanding transport mechanisms but existing reports have focused on unipolar organic characteristics. No previous reports on ambipolar organic devices have involved entire velocity distribution and charge transport mechanisms. Recently, we have fabricated ambipolar OTFTs based on a diketopyrrolopyrrole-benzothiadiazole copolymer (PDPP-TBT) with a field-effect mobility of more than 0.2 cm^2 $V^{-}1$ $s^{-}1$. Velocity distributions are measured by performing specialized dynamic measurements while keeping the RC-time constant of the measurement circuit small. This yields a distribution in arrival times of charge carriers from source to drain which can be converted to velocity distributions. We will also describe dynamic transport measurements on high-k-dielectric PDPP-TBT OTFTs.

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