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Hall effect and band-like carrier transport in high mobility polymer transistors YU YAMASHITA, The University of Tokyo, FELIX HINKEL, TOMASZ MARSZALEK, WOJCIECH ZAJACZKOWSKI, WOJCIECH PISULA, MARTIN BAUMGARTEN, Max Planck Institute for Polymer Research, HIROYUKI MATSUI, The University of Tokyo, KLAUS MLLEN, Max Planck Institute for Polymer Research, JUN TAKEYA, The University of Tokyo, PROF. TAKEYA GROUP TEAM, PROF. MLLEN GROUP TEAM — A microscopic understanding of charge carrier transport in polymeric semiconductors is essential to improve the state of the art of flexible or printed electronic devices. In particular, thin-film field-effect transistors based on donor-acceptor polymers are in the focus of current literature reaching high charge-carrier mobility. In this work, we demonstrate the Hall effect and the temperature dependence of the charge carrier mobility based on uniaxially ordered CDT-BTZ donor-acceptor copolymer films. Uniaxially ordered films of CDT-BTZ with hexadecyl (C16) and eicosyl (C20) sidechains showed mobility of $5.6 \text{ cm}^2/\text{Vs}$ and $11.4 \text{ cm}^2/\text{Vs}$ respectively. The activation energy of the mobility decreased with the increasing carrier density, and finally the negative temperature dependence of the mobility was observed. Both polymers showed Hall effect, which also indicates the presence of extended electronic states. The temperature and carrier density dependence will be further discussed in the presentation.

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