

Abstract Submitted
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Charge transport in ion-gel gated IDTBT transistors SHUN WANG, BEI BAO, XIANYI SHAO, LU TAN, YUESHEN WU, LIBIN WEN, XUXU BAI, XIAOJUN GUO, YING LIU, Shanghai Jiao Tong University — Ionic liquids (ion gels) have been employed as the gate dielectric for polymer transistors due to its ultra-high capacitance. At high charge carrier density provided by ionic liquid gating, polymers like P3HT and PBTTT can exhibit very high mobility. We have fabricated ion-gel gated IDTBT transistors and measured its charge transport properties. We found that the mobility of ion-gel gated IDTBT transistors is greatly suppressed compared to the Cytop gated devices. At carrier density on the order of $10^{21}/\text{cm}^3$, IDTBT shows mobility of about $0.05 \text{ cm}^2/\text{V}/\text{s}$. Detailed analysis of the temperature dependence of resistivity shows 3D Mott variable range hopping in IDTBT at such carrier density, indicating a different charge transport mechanism from Cytop gated device.

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