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Counter-ion and dopant effects on charge carriers in intrinsically conductive polymer JONATHAN OGLE, MANDEFRO YEHULIE, CHRISTOPH BOEHME, LUISA WHITTAKER-BROOKS, Univ of Utah — Recently, a significant amount of attention has been devoted to the optimization and applications of organic electronics. In particular, intrinsically conductive polymers have seen a strong continued interest for their use in thermoelectric and photovoltaic devices. With conductivities ranging from 10^{-8} to 10^{3} S cm^{-1}, the conductive polymer poly(3,4-ethylenedioxythiophene) -PEDOT is one of the most studied solution-processable polymer material due to its unique optical and electronic properties. While charge carriers at lower conductivities have been identified as polarons, an understanding of the electronic structure of PEDOT as its conductivity increases is not well understood. We have investigated the effect that counter-ion exchange and doping has on the polaron concentration of PEDOT via electron paramagnetic resonance, ultraviolet photoelectron spectroscopy, and X-ray absorption fine structure spectroscopy studies. Such studies have allowed us to correlate charge carriers concentrations and the real and virtual electronic states in PEDOT as a function of various dopants. As discussed in our talk, we believe our findings could be extended to the understanding of other polymeric materials.

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