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Thermoelectric properties of hole- and electron-doped ambipolar polymers ANNE GLAUDELL, ERIN PERRY, RUTH SCHLITZ, MICHAEL CHABINYC, Univ of California - Santa Barbara — The library of possible materials, both p- and n-type, for organic thermoelectric devices has been steadily growing with the continuous improvement in electrical properties and stability. Maximizing the thermoelectric power factor in these materials requires the simultaneous optimization of both electrical conductivity and thermopower. The challenge remains that charge transport is not well understood in organic materials due to energetic disorder from crystalline and non-crystalline domains. We have performed temperature-dependent measurements of both thermopower and electrical conductivity to uncover the relationship between microstructure and thermoelectric performance. These measurements were complemented by techniques such as electronic paramagnetic resonance (EPR) that help provide the carrier concentration to give a more complete picture of the competing charge transport mechanisms and structure-property relationships. We will present results on p- and n-type doping of ambipolar polymers that reveal the difference in thermopower for electrons and holes in the same material. An ideal thermoelectric device has n- and p-type legs with similar mechanical and thermoelectric properties, a balance more easily realized using the same polymer for each leg.

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