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Identification of Both Bipolaron and Electron-Hole Pair Contributions to Organic Magnetoresistance in a Regioregular Polythiophene Device

Organic Electronics

My research focuses on magneto-conductive effects in organic light emitting diodes (OLEDs). As a magnetic field is introduced into the region of an OLED, the amount of current flowing through the organic layer changes, indicating a change in the material's conductance. Our paper shows that this effect is the result of not one but two effects that are in competition. One, the bipolaron effect, works to decrease current when a magnetic field is applied to the device, while a second, the electron-hole pair effect, increases the current. Which effect is dominant depends upon the voltage and temperature at which the device is operated.

