

Ambipolar Organic Phototransistors Based on Indigo Derivatives

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Rapid technological progress toward the organic electronics field has developed many high-performance small-molecule semiconductors for organic field-effect transistors (OFETs) and organic phototransistors (OPTs). However, most semiconducting materials have been reported to give unipolar *p*-channel operation because *n*-channel materials, which have high-LUMO energy levels, are usually very reactive in ambient air conditions. Herein, we report on indigo derivatives (6,6'-dibromoindigo) with strong electron-withdrawing groups which can improve environmental stability and finally achieved *n*-channel dominant ambipolar charge transport. Interestingly, ambipolar OFETs exhibit enhanced device performance under illumination, leading to the function of phototransistor with ambipolar behavior. As well as stability and photoactivity, indigos have attracted great interest due to its flexibility and environment-friendly properties. Therefore organic compounds with indigo backbones, which have very low toxicity and natural occurrence, are expected to apply as biocompatible organic semiconductors.