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Highly stable and flexible transparent conductive polymer electrode patterns for large-scale organic transistors

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Abstract

The application of conductive polymer polypyrrole (PPY) towards transparent and flexible electronics has been demonstrated by a photolithography-compatible technique. The oxygen plasma pretreatment was found to be important for successful fabrication of PPY electrode patterns on flexible poly(ethylene terephthalate) (PET). By the patterning process of PPY, the transparency of PPY electrode can be improved up to >80% over the visible spectrum, which combined with the excellent chemical and physical stability of PPY shows the huge potential of PPY electrode as flexible transparent conductive electrode. In addition, PPY provides better interface connection for uniform deposition of organic semiconductor thin film. These outstanding advantages in PPY, coupled with selection of a novel anti-solvent and water-tolerant elastic dielectric, enable the photolithographic PPY patterns to be used for fabrication of large-scale flexible transparent organic field-effect transistor arrays. These results open up the capability of PPY as flexible transparent electrode for flexible organic devices, and exhibit a strong potential of PPY electrode patterns for future large-scale high-precision flexible electronics.

Keywords: Flexible electrodes, Transparent electrode patterns, Highly stable electrodes,

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