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Tips-Pentacene OTFT电极接触电阻的研究

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摘要： 采用转移线性法分析了以PVP为栅绝缘层、以Tips-pentacene为有源层的有机薄膜晶体管(OTFT)电极与有源层间的接触电阻,其中介电层和有源层均采用旋涂法制备,银电极采用喷墨印刷法制备。沟道长度分别取200,250,300 μm和400 μm,有源层退火时间分别为2 h,6 h和10 h,提取到的3种不同退火时间的OTFT的接触电阻分别为8 MΩ,4.5 MΩ和3 MΩ,退火10 h的OTFT的接触电阻较小主要是因为较长时间的退火使得Tips-pentacene有源层中的杂质较少,电极和有源层之间的接触势垒较小。

关键词： 转移线性法 有机薄膜晶体管 接触电阻 喷墨打印

Contact Resistance of Electrodes in Tips-Pentacene OTFTs

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Abstract: This paper analyzed the contact resistance between inkjet-printed silver source/drain (S/D) electrodes and organic semiconductor layer of Organic Thin-film Transistors(OTFTs) using transmission line method(TLM). Spin-coated PVP thin-film and Tips-pentacene thin-film were used as gate dielectric layer and semiconductor layer, respectively. S/D electrodes with four different channel lengths of 200,250,300 μm and 400 μm were inkjet-printed,and the annealed time of different semiconductor layers was 2 h,6 h and 10 h,respectively. The extracted contact resistances were 8 MΩ,4.5 MΩ and 3 MΩ for OTFTs with three different kinds of annealed time, respectively. Lower contact resistance for OTFTs with annealed time of 10 h can be explained by the fact that longtime annealing can reduce the impurity in the semiconductor layer and lower the contact barrier between electrodes and semiconductor layer.

Keywords: transmission line method organic thin-film transistor contact resistance inkjet-printing

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