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摘要: 利用化学气相沉积法生长的高性能的层状石墨烯,通过转移和图案化后用作电极,制备了底接触的并五苯有机薄膜晶体管(OTFTs)。原子显微镜观察发现,石墨烯电极的厚度比一般的金电极薄的多,所以石墨烯电极厚度对并五苯晶粒的生长影响不大。电学性能研究得到器件的输和转移曲线、开关电流比、阈值电压、场效应迁移率。转移曲线的关态电流约为 10^{-9} A,电流的开关比超过 10^3 。基于底接触的并五苯OTFT:的最大场效应迁移率约 $2 \times 10^{-2} \text{ cm}^2 \cdot \text{V}^{-1} \cdot \text{s}^{-1}$ 。

关键词: 有机薄膜晶体管 层状石墨烯 图案化 电性能

Organic Thin-Film Transistor Based on Graphene Electrodes

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Abstract: High-performance bottom-contact pentacene OTFTs with graphene source/drain electrodes by transferring and patterning CVD-grown graphene films in a room-temperature process has been developed. The AFM images show that the growth of pentacene grains was not affected by the electrode, because patterned graphene electrodes were significantly thinner compared to common metal electrodes. The output and transfer curve, on/off current ratio, threshold voltage and field-effect mobility of the device were obtained by electric measurements. The transfer curve showed an off-current level of $\approx 10^9$ A and an on/off current ratio exceeding 10^3 . The bottom-contact pentacene OTF based on graphene source/drain electrodes had a maximum field-effect mobility of up to $2 \times 10^{-2} \text{ cm}^2 \cdot \text{V}^{-1} \cdot \text{s}^{-1}$.

Keywords: organic thin film transistor layered graphene patterned electrical properties

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