



器件制备及器件物理

ITO/Rubrene表面及界面的AFM和XPS研究

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摘要：采用原子力显微镜（AFM）和X射线光电子能谱仪（XPS）研究了氧化铟锡（ITO）/红荧烯（Rubrene）的形貌和表面、界面的电子态。AFM结果显示，ITO上的Rubrene膜有良好的均匀性。XPS结果表明：C1s谱有3个峰，位于282.50、284.70、289.30 eV，对应于C—Si、C O和C—C键。用氩离子束溅射表面，芳香碳对应的峰值逐渐增大，其他两个峰值迅速消失。随着表面O污染的去除，O1s峰先快速减弱然后逐渐增强。界面附近的O原子与C原子结合构成O C、C—O—C和醛基。In3d和Sn3d峰则缓慢增强，在界面附近峰值变得稳定。C1s、In3d、Sn3d谱峰都向低束缚能发生化学位移，表明ITO与Rubrene在界面发生了相互作用，形成一个互扩散层。

关键词：XPS Rubrene 化学位移 界面态

Surface and Interface Analysis of ITO/Rubrene Using AFM and XPS

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Abstract: The surface morphology and the interface electronic states of Indium-tin-oxide (ITO)/Rubrene were investigated by atomic force microscopy (AFM) and X-ray photoelectron spectroscopy (XPS). The AFM results manifest that the Rubrene film deposited on ITO is very uniformity. The XPS results show that there are three main peaks in the C1s spectrum of the origin surface, which located at 282.50, 284.70, 289.30 eV, respectively. They are associated with C—Si, C O, C—C bonds. With the increasing of sputtering time, the peak corresponding to the aromatic C becomes intensely while the other peaks disappear rapidly. As the removing of the oxygen contamination on the surface, the O1s peak weakens firstly and then strengthens gradually. The O atoms mainly bond to C, and form O C, C—O—C and aldehyde group in the interface. The peaks of In3d and Sn3d strengthen slowly, and become stable near the interface of ITO/Rubrene. The peak of C1s, In3d and Sn3d moves toward lower binding energy, indicating an inter-diffusion system formed by the interaction of Rubrene film and ITO in the interface.

Keywords: XPS Rubrene chemical shift interfacial state

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