

CuPc/CuPc : C₆₀/Alq/Al结构的有机太阳能电池

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Organic Solar Cells Based on CuPc/CuPc : C₆₀/Alq /Al Structure

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摘要

制备了一种ITO/CuPc/CuPc : C₆₀/Alq/Al结构的PIN有机太阳能电池, 采用Cu-phthalocyanine (CuPc)和fullerene (C₆₀)的共混层作为光吸收层, CuPc和Alq作为空穴传输层和电子传输层. 利用真空蒸发镀膜法制备各层有机薄膜, 并用I-V曲线和紫外可见吸收光谱来表征器件性能. 研究了器件的光吸收层、电子传输层、空穴传输层的膜厚参数对器件性能的影响. 结果表明, 当器件光吸收层、电子传输层、空穴传输层的厚度分别为15, 30, 40 nm时, 器件的性能达到最优化. 优化器件的短路电流密度 J_{SC}为2.07 mA · cm⁻², 开路电压 V_{OC}为0.56 V, 填充因子 F_p为0.46, 器件的能量转换效率达到0.53%.

关键词: [有机太阳能电池](#); [PIN](#); [Alq](#); [真空蒸发](#)

Abstract:

Blends of Cu phthalocyanine (CuPc) and fullerene (C₆₀) was used as an active layer and Alq and CuPc as a transport layer to fabricate a CuPc/CuPc : C₆₀/Alq/Al PIN type organic solar cell. These layers were grown with a vacuum evaporation method and characterized with I-V curve and UV visible spectrometry. Cell performance with different thickness of the active layers, P layer and N layer, has been studied. The results show that when thicknesses of the active layers, N layer and P layer, are 15, 30 and 40 nm, respectively, the prepared solar cell has a good performance. The cell parameters with optimal P, I, and N layers have been measured as J_{SC} = 2.07 mA · cm⁻², V_{OC} = 0.53 V, and F_p = 0.46. Power efficiency of this kind of solar cell can reach approximately over 0.53%.

Keywords: [organic solar cell](#); [PIN](#); [Alq](#); [vacuum evaporation](#)

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