

ZnO/SnS复合薄膜的制备及其光伏性能

伍丽, 史伟民, 张兆春, 秦娟, 王林军, 魏光普, 夏义本

(上海大学 材料科学与工程学院, 上海 200072)

Fabrication and Photovoltaic Properties of ZnO/SnS Coextruded Films

WU Li, SHI Wei-min, ZHANG Zhao-chun, QIN Juan, WANG Lin-jun, WEI Guang-pu, XIA Yi-ben

(School of Materials Science and Engineering, Shanghai University, Shanghai 200072, China)

- [摘要](#)
- [参考文献](#)
- [相关文章](#)

Download: PDF (1342KB) [HTML](#) (1KB) Export: BibTeX or EndNote (RIS) [Supporting Info](#)

摘要

利用n型氧化锌和p型硫化亚锡制备ITO/ZnO/SnS/Al结构的pn结太阳能电池. 首先采用射频磁控溅射法在ITO衬底上制备ZnO薄膜, 再用真空蒸发镀膜法沉积SnS薄膜以形成异质结, 并利用X射线衍射(X-ray diffraction, XRD)光谱、透射光谱和I-V曲线来表征薄膜和器件的性能. 讨论在不同溅射功率和工作气压下制备的ZnO薄膜对光吸收情况和所形成异质结器件的影响, 测量不同沉积时间制备的ZnO薄膜相应的器件的开路电压、短路电流密度和填充因子. 结果表明, 当工作气压和溅射功率分别为0.2 Pa和150 W, 沉积时间为40 min时得到的ZnO薄膜能获得较好的异质结且器件的性能达到最优化. 该最优器件的短路电流密度 J_{SC} 为 $1.38 \text{ mA} \cdot \text{cm}^{-2}$, 开路电压 V_{OC} 为0.42 V, 填充因子 F_F 为0.40.

关键词: [太阳能电池](#); [SnS](#); [ZnO](#); [真空蒸发](#); [磁控溅射](#)

Abstract:

The n type ZnO and p type SnS were used to prepare solar cells with the structure of ITO/ZnO/SnS/Al. The n-ZnO thin films were first obtained on the ITO substrate by using RF magnetron sputtering with different working pressures and sputtering powers. The p-SnS thin films were then deposited on the n-ZnO layers by vacuum evaporation. Qualities of ZnO thin films were analyzed with an ultraviolet visible spectrophotometer (UV/VIS) and the properties of heterojunctions were measured with X-ray diffraction (XRD). The photoelectric properties of SnS/ZnO heterojunction solar cells were characterized with I-V curves. As a result, a better solar cell was prepared with the fabrication of n-ZnO under 0.2 Pa working pressure, 150 W sputtering power and 40 min depositing time. The cell parameters are: $J_{SC} = 1.38 \text{ mA} \cdot \text{cm}^{-2}$, $V_{OC} = 0.42 \text{ V}$, $F_F = 0.40$.

Keywords: [solar cell](#); [SnS](#); [ZnO](#); [vacuum evaporation](#); [magnetron sputtering](#)

收稿日期: 2009-02-24;

通讯作者 史伟民(1951-), 男, 教授, 研究方向为功能材料与器件. Email: wmsi@mail.shu.edu.cn

引用本文:

.ZnO/SnS复合薄膜的制备及其光伏性能[J] 上海大学学报(自然科学版), 2010,V16(4): 436-440

.Fabrication and Photovoltaic Properties of ZnO/SnS Coextruded Films[J] J.Shanghai University (Natural Science Edition), 2010,V16(4): 436-4

链接本文:

<http://www.journal.shu.edu.cn//CN/> 或 <http://www.journal.shu.edu.cn//CN/Y2010/V16/I4/436>

没有本文参考文献

没有找到本文相关文章

Service

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [Email Alert](#)
- ▶ [RSS](#)

作者相关文章