

论文

低压MOCVD生长参量对II型InAs/GaSb超晶格材料表面形貌的影响

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摘要:

采用自制低压金属有机源化学气相沉积设备,在(100)面GaSb单晶衬底上生长了II型InAs/GaSb超晶格材料.利用双晶X射线衍射、光学显微镜、原子力显微镜和光致发光谱等分析手段对材料特性进行了表征,获得了表面光亮的晶体质量较好的II型InAs/GaSb超晶格材料,在77 K下得到光致发光谱峰值波长为3.25 μm.研究了生长温度、过渡层、界面层对其表面形貌的影响,得出生长温度在500 °C~520 °C,无过渡层,使用InAsSb界面层有利于改善材料的表面形貌.

关键词: 超晶格 金属有机源化学气相沉积 界面层 表面形貌

Effect of the LP-MOCVD Growth Parameters For Type-II InAs/GaSb Superlattices Surface Morphology

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Abstract:

Type-II InAs/GaSb superlattices materials were grown on (100) GaSb substrate in a horizontal quartz reactor by a home-made low pressure metal organic chemical vapor deposition (LP-MOCVD).Growth surface structures and morphologies were characterized by means of double crystal X-ray diffraction (DCXRD),atomic force microscopy (AFM) and photo-luminescence (PL).High quality mirror-like surfaces type-II InAs/GaSb superlattices materials were obtained.Photoluminescence results show that the peak wavelength of the type-II InAs/GaSb superlattices at 77 K is 3.25 μm.The effects of growth temperature,buffer layer and interfacial layer for surface morphology were discussed.The condition that growth temperature in 500 °C~520 °C,without buffer layer and InAsSb interfacial layer can improve the surface morphology of the material.

Keywords: Superlattices LP-MOCVD Interfacial layer Surface morphology

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