红外与毫米波学报 JOURNAL OF INFRARED AND MILLIMETER WAVES ISSN1001-9014 CN 31-1577

镧掺杂BiGaO3多晶薄膜光学性质

Received: July 04, 2014 Revised: May 25, 2015 点此下载全文

引用本文：张金中,诸佳俊,邓青林,余温雷,李亚巍,胡志高,孟祥建,褚君浩.镧掺杂BiGaO3多晶薄膜光学性质[J].Journal of Infrared and Millimeter Waves,2015,34(4):447~451

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基金项目:国家重点基础研究发展规划(2011CB922200、2013CB922300); 国家自然科学基金(11374097、61376129)；上海市科学技术委员会项目(13JC1402100、13JC1404200)；上海高校特聘教授 (东方学者)项目

中文摘要:采用溶胶-凝胶技术在Pt/Ti/SiO2/Si衬底上制备了不同镧掺杂浓度BiGaO3(LxBGO, 0≤x≤0.1)薄膜.X-射线衍射(XRD)表明该属于正交晶系的多晶薄膜, 原子力显微镜(AFM)图像显示样品表面具有很好的平整性.采用椭圆偏振技术对其光学性质进行了详细的研究, 发现其光学常数符合Adachi色散模型.进一步发现其禁带宽度随着镧掺杂浓度的增加而增加, 该规律与理论预言相吻合.有关LxBGO材料的研究为铋基光电器件如紫外探测器的实现提供物理基础支持.

中文关键词: BiGaO3 椭圆偏振光谱 光学性质 光学常数 光学禁带宽度

TThe optical properties of La doped BiGaO3 polycrystalline films

Abstract: La doped BiGaO3 (LxBGO) films were fabricated by the Sol-Gel method on the Pt/Ti/SiO2/Si substrates. X-ray diffraction analysis shows that the films are polycrystalline with an orthorhombic structure. The atomic force microscopy images of the LxBGO films suggest that the surface morphology is smooth. The optical properties of the samples were investigated by the spectroscopic ellipsometry in detail. The dielectric functions were extracted and in good agreement with the Adachi dispersion function. More one step, the optical band gap tends to increase with increasing La composition, which is consistent with the results of theoretical prediction. These results are helpful for the fabrication of Bi-based opto-electrical devices such as ultraviolet detectors.

keywords: BiGaO3, spectroscopic ellipsometry, optical properties, optical constants, optical band gap

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