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论文

退火对溅射ZnO薄膜的形貌和内应力的影响

常春荣，李子全，徐芸芸，周衡志，骆心怡

（南京航空航天大学 材料科学与技术学院，南京210016）

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摘要　用超高真空射频磁控溅射技术制备了高C轴取向的ZnO薄膜，
用扫描电镜和X射线衍射仪分别研究了退火对ZnO薄膜形貌和内应力的影响。结果表明：适当温度退火后薄膜的形貌和内应力得到改善，通过增氧、缺陷原子的热激活和晶粒融合等可以有效地降低薄膜中由热效应、缺陷效应和粒子注入效应等引起的张应力，
薄膜组织致密化并且柱状晶粒取向趋于一致。450℃退火的ZnO薄膜具有最低的张应力和最佳的结晶质量。

关键词　ZnO薄膜　退火　形貌　内应力

分类号　0484.4

Effect of annealing on surface morphology and residual stress of sputtered ZnO thin film

CHANG Chun-rong, LI Zi-quan, XU Yun-yun, ZHOU Heng-zhi, LUO Xin-yi

(College of Materials Science and Technology, Nanjing University of Aeronautics and Astronautics , Nanjing 210016, China)

Abstract Highly C-axis oriented ZnO thin films were prepared by high-vacuum RF magnetron sputtering technique. The effect of annealing temperatures on the surface morphology and residual stress of ZnO thin film was studied by SEM and XRD. Results show that the surface morphology and residual stress of appropriately annealed film are improved. By introduction of oxygen,heat activation of defect atoms and combination of small grains, the tensile stress in the film induced by heat effect,defect effect and inpouring effect of particles decreases significantly. The grain microconstituent is compacted and the orientation of crystal-grain-columns increases. The minimum residual tensile stress and the optimal crystalline quality of ZnO thin film are obtained by being annealed at 450℃.

Key words ZnO thin film　anneal　surface morphology　residual stress

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通讯作者 常春荣

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