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# ZnO陶瓷靶制备及其薄膜 RF溅射工艺研究

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摘要 利用固相反应制备了直径为70mm, 厚度为10～15mm高质量掺杂$Li_2CO_2$的ZnO陶瓷靶材, 实验了不同摩尔浓度的$Li^+$掺杂对靶材性能的影响, 确定了最佳$Li^+$掺杂量为2.2mol%, 同时通过在不同温度烧结实验、不同成型压力实验确定了ZnO靶材制备的最佳工艺, 并采用所制备的ZnO-$Li_{2.2\%}$陶瓷靶和RF(射频磁控)技术在Si(100)、玻璃(载玻片)、及Pt(111)/Ti/$SiO_2$/Si(100)基片上制备出高度c轴(002)择优取向的ZnO薄膜, 其绝缘电阻率ρ为$4.12\times10^8$Ω·cm, 达到了声表面波器件(SAW)的使用要求.

关键词 陶瓷靶 氧化锌薄膜 射频磁控溅射 择优取向

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# Li-doped ZnO Ceramic Target Preparation and RF Magnetron Sputtering ZnO Films

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**Abstract** We successfully prepared high quality Li-doped ZnO ceramic targets with 70mm in diameter and 10～15mm in depth by solid-state reactions. The paper studied the influence of different concentration of $Li_2CO_3$ on the electrical properties of ZnO ceramic target. By comparing and analyzing the IR( insulative resistivity ) and tgδ(dielectric loss), the optimum concentration of $Li_2CO_3$ doped in ZnO ceramic target was obtained(2.2%mol ratio). And the optimum process for preparing ZnO-$Li_{2.2\%}$ ceramic target was also realized through the investigation of physics and electrics of ZnO ceramic under the different sintering temperatures and molding pressure treatments. By using $Li_{2.2\%}$-doped ZnO ceramic as the target, the ZnO films with highly c-axis (002) preferred orientation were grown by RF magnetron sputtering on Si(100), glass and Pt(111)/Ti/SiO2/Si(100) substrates respectively.

**Key words** ceramic target zinc oxide films RF magnetron sputtering preferred orientation

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