

论文

无机EL显示器件用高性能介电层的研究

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收稿日期 2005-5-31 修回日期 2005-7-5 网络版发布日期 2006-4-25 接受日期

摘要 用rf和反应磁控溅射法成功制备了一种总厚度为530~730nm的SrTiO₃/Ta₂O₅复合介电层, 获得在500Hz下介电常数为48~73, 反映介电损耗的参数ΔVy在0.06~0.15V之间, 击穿场强为106~139MV/m, 在0.05V/nm的电场下正、反向漏电流在10⁻⁹~10⁻⁷ A/cm²之间, 品质因子(ε_rε₀E_b)大于

5μc/cm²。同时比较了SrTiO₃/Ta₂O₅复合介电层和SrTiO₃和Ta₂O₅

单层薄膜的介电性能。把复合膜应用于以ZnS:Mn和Zn₂Si_{0.5}Ge_{0.5}O₄:Mn为发光材料的器件中, 获得了适当的阈值电压和较高的亮度。

关键词 [无机EL](#) [SrTiO₃薄膜](#) [Ta₂O₅薄膜](#) [SrTiO₃/Ta₂O₅复合膜](#)

分类号 [TN104.3](#)

High performance dielectric layer for inorganic thin film electroluminescent devices

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Abstract SrTiO₃/Ta₂O₅ doubly stacked dielectric layers with a total thickness of 530 nm to 730 nm were prepared by rf and dc reactive magnetron sputtering. The relative dielectric constant was measured to be 48 to 73 and the ΔVy which reflects the loss tangent ranges from 0.06 V to 0.15 V at 500 Hz. The breakdown field strength is between 106 MV/m and 139 MV/m. The forward and reverse leakage current density is between 10⁻⁹ A/cm² and 10⁻⁷ A/cm² at an applied field of 0.05 V/nm, and the figure of merit is higher than 5 μc/cm². The dielectric properties of the doubly stacked dielectric layers are also compared with single SrTiO₃ and Ta₂O₅ thin films. The doubly stacked dielectric layers were applied to the inorganic TFEL devices with ZnS: Mn and Zn₂Si_{0.5}Ge_{0.5}O₄:Mn thin film phosphor. And suitable threshold voltage and high luminance are achieved.

Key words [inorganic EL](#) [SrTiO₃ thin film](#) [Ta₂O₅ thin film](#) [SrTiO₃/Ta₂O₅ stacked layer](#)

DOI:

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