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正交相二氧化锡薄膜的制备与性能

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Preparation and Properties of Orthorhombic SnO_2 Thin Films

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摘要 二氧化锡(SnO_2)的一种晶体结构——正交相是高温高压相, 不易合成, 因此, 其性质探测和技术应用研究一直停滞不前. 利用脉冲激光沉积(pulsed laser deposition, PLD)技术, 在相对较低压力和较低温度下制备较纯的正交相SnO_2薄膜. 实验结果表明, 这种正交相SnO_2薄膜的透明度优于常规四方相SnO_2, 其半导体带隙大于四方相SnO_2.

关键词: 二氧化锡SnO_2 正交相 薄膜 脉冲激光沉积

Abstract: Orthorhombic phase SnO_2 is a material with unknown optical, electrical, and gas sensing properties. It was found previously only at high pressures and temperatures. Using pulsed laser deposition (PLD), this paper reports a kind of experimental realization of a pure orthorhombic SnO_2 thin film under low pressure and temperature that are much lower than those of traditional methods. The optical properties of an orthorhombic SnO_2 thin film were measured by spectrophotometric transmittance. An oxygen exchange reaction mechanism at the grain interfaces is proposed to explain the formation and optical properties of this orthorhombic phase.

Keywords: SnO2, orthorhombic, thin film, pulsed laser deposition (PLD)

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