

交流濺鍍法製備之氧化鋅透明導電薄膜之

電性及光學性質探討


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摘要



近年來，利用濺鍍機製備之鋁摻雜氧化鋅在光電元件的應用上已成為令人感興趣的透明導電氧化物材料之一。本論文在四點探針技術、光穿透量測、X光繞射分析、及掃描式電子顯微鏡的輔助下，用交流濺鍍機於不同的工作氣壓、濺鍍功率、基板溫度、及鋁摻雜量，在玻璃基板上沉積之鋁摻雜氧化鋅薄膜的特性將會被好好的研究，包含它的物性、電性、和光學性質。藉由在交流濺鍍機最佳化這些沉積參數，鋁摻雜氧化鋅薄膜的品質將可以被大大的提升。也因此光電應用上，用濺鍍法沉積之鋁摻雜氧化鋅薄膜似乎是很有希望的透明導電氧化物材料。


Electrical and Optical Properties of RF-sputtered Transparent Conducting ZnO Thin Films

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Abstract



In recent years, sputter-deposited Al-doped ZnO (AZO) is an interesting transparent conducting oxide (TCO) material for application in optoelectronic devices. In this thesis, the physical, electrical, and optical properties of the AZO films prepared by the RF magnetron sputtering on glass substrates at variable working pressure, deposition power, substrate temperature, and Al dopant content had been investigated using the four-point probe technique, optical transmittance measurements, X-ray diffraction analysis, and scanning electron microscopy. The quality of the AZO films prepared by the RF magnetron sputtering can be well improved by optimizing the deposition parameters. Hence, it seems that the sputter-deposited AZO is a promising TCO material for optoelectronic applications.