

ZnO薄膜紫外探测器的研制

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摘要:

利用射频磁控溅射技术在SiO₂/n-Si衬底上制备了ZnO薄膜,并在薄膜上制作了Ag-ZnO肖特基二极管和Ag-ZnO-Ag肖特基 MSM叉指结构的紫外探测器。所制备的ZnO薄膜具有良好的c轴择优取向,表面平整,在可见光范围具有较高的透射率,吸收边在370nm附近;所制作的肖特基二极管显示了良好的整流特性,有效势垒高度约为0.65eV;所制作的MSM紫外探测器在5V偏压下漏电流为 3.3×10^{-8} A,在紫外波段有较高的响应度,光响应度峰值在365nm附近。

关键词: ZnO薄膜; 磁控溅射; 肖特基二极管; 紫外探测器

Ultraviolet Photodetector based on ZnO films

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Abstract:

The ZnO films were deposited on SiO₂/n-Si by RF magnetron sputtering. ZnO Schottky diodes and the interdigital metal-semiconductor-metal (MSM) ultraviolet (UV) photodetectors were fabricated by using Ag as Schottky contact metal. The ZnO films have a preferential c-axis orientation and smooth surface. The films exhibit a high transmittance in visible region and have sharp fundamental absorption edge at about 370nm. The Schottky diodes exhibit the distinct rectifying characteristics. The barrier height of Ag-ZnO Schottky contacts is about 0.65eV. I-V characteristics of the MSM photodetector indicates that the leakage current is 3.3×10^{-8} A at a bias of 5V. The photoresponsivity of the detector is high in the ultraviolet range and has a maximum value at about 365nm.

Keywords: ZnO film; magnetron sputtering; Schottky diode; UV photodetector

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