

论文

# Pt-GaAs肖特基势垒雪崩光电探测器的研究

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摘要

Pt-GaAs肖特基势垒雪崩光电探测器已研制成功。器件制作在施主浓度为 $0.5\sim 3\times 10^{15}\text{cm}^{-3}$ 、厚度约为 $20\mu\text{m}$ 的GaAs外延层上。为防止边缘击穿,用能量为500keV、剂量为 $1\times 10^{15}\text{cm}^{-2}$ 的质子轰击,在直径为 $150\mu\text{m}$ 的光敏区外形成高阻保护区。半透明的Pt肖特基势垒膜用特殊的蒸发法形成。器件的峰值响应波长随偏压的改变可以从8600(A)移动到8835(A),截止波长可延伸到9700(A),观察到明显的Franz-Keldysh效应。器件倍增可达100以上;暗电流仅几纳安;过剩噪声系数为7;上升、下降时间短于1ns。这种器件可与FET实现平面集成。

关键词 [雪崩光电探测器](#) [GaAs](#) [肖特基势垒](#)

分类号

## STUDY ON Pt-GaAs SCHOTTKY BARRIER APD

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Abstract

Pt-GaAs Schottky barrier APDs have been investigated. The devices were fabricated on GaAs epitaxial layer with carrier concentration of  $0.5\sim 3\times 10^{15}\text{cm}^{-3}$  and thickness of about  $20\mu\text{m}$ . Guard ring along with sensitive area was formed by  $\text{H}^+$  bombardment with energy of 500 keV and dosage of  $1\times 10^{15}\text{cm}^{-2}$  to prevent edge breakdown. Semi-transparent Pt film was evaporated using a special evaporation source. The peak response wavelength of the device is  $8600\text{\AA}\sim 8835\text{\AA}$  at different bias voltages. Optical absorption edge could be extended to  $9700\text{\AA}$ . Franz-Keldysh effect has been observed. The multiplication of above 100 could reach. Dark current is about several nA. Excess noise coefficient is 7 and both rise and fall time were less than 1 ns. The device could be integrated monolithically and planarly with GaAs FET.

Key words [Avalanche photo-detector](#) [GaAs](#) [Schottky barrier](#)

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