

光电导开关中的隧穿现象

作者: 刘庆纲^{1*}, 高霞¹, 赵琳¹, 江宁川¹, 胡小唐¹

单位: 1.精密测试技术及仪器国家重点实验室, 天津大学

基金项目:

摘要:

采用光刻和大气环境下原子力显微镜(AFM) 阳极诱导氧化加工相结合的加工方法, 加工由Ti-TiO_x-Ti纳米级隧道结构成其基本结构的微型光电导开关(PCSS), 并对其电特性进行了研究和分析。研究结果表明在大气室温条件下, 微型PCSS的输出特性随氧化物宽度不同而不同, 当宽度小于100nm时, 其输出特性表现为在一个线性峰值的输出过后, 又出现了一个非线性的峰值; 在一定条件下Ti-TiO_x-Ti纳米级隧道结存在隧穿效应, 且其隧穿特性随绝缘金属氧化物的宽度不同而不同。

关键词: 微型光电导开关(PCSS); 隧道结; 隧穿现象; AFM阳极诱导氧化

Tunneling Phenomenon in the Photoconductive Semiconductor Switch

Author's Name: LIU Qing-gang^{1*}, GAO Xia¹, ZHAO Lin¹, JIANG Ning-chuan¹, HU Xiao-tang¹

Institution: (1. State key Lab of Precision Measuring Technology & Instruments, Tianjin University

Abstract:

In this paper, photoconductive semiconductor switch (PCSS) is fabricated by combining lithography technique and atomic force microscope (AFM)'s tip induced anodic oxidation technique in air ambient. The nanometer scale Ti-TiO_x-Ti tunneling junction forms the basic PCSS's structure. The electric characteristic of the PCSS is analyzed. The micro type PCSS's output characteristic varies with the width of the TiO_x in air ambient and room temperature. When the width is narrower than 100nm, the output curve appears another nonlinear peak after a normal linear one, and there is a tunneling phenomenon in the Ti-TiO_x-Ti junction which has different tunneling characteristic with different TiO_x width.

Keywords: photoconductive semiconductor switch (PCSS); tunneling junction; tunneling phenomenon; AFM tip-induced anodic oxidation

投稿时间: 2010-03-31

[查看pdf文件](#)