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器件制备及器件物理

介电体围绕下绳束状碳纳米管的场发射特性

高见[1], 佟钰[1], 夏枫[1], 刘俊秀[1], 曾尤[2]
1. 沈阳建筑大学材料科学与工程学院, 辽宁 沈阳 110168;
2. 沈阳材料科学国家实验室中国科学院金属研究所, 辽宁 沈阳 110016

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摘要： 在周边环绕玻璃薄片介电体的作用下,绳束状碳纳米管宏观体的场发射电流发生异常跃迁,同时伴随有场发射电子光斑的横向扩展,导致跃迁后的场发射电流明显高于正常情况。所有观察到的现象均与介电体存在下的电场重新分布和电子轨迹偏离有关。理论分析及随后的场发射测试检验了介电体几何尺寸、间距、介电常数等因素对场发射*I-V*性能的影响。研究结果提供了一种控制Spindt型场发射体电子发射性能的新的可行途径。

关键词： 碳纳米管 场发射 电子轨迹 介电体

Field Emission Characteristics of Single Wall Carbon Nanotube Rope at The Presence of Dielectric Medium

GAO Jian[1], TONG Yu[1], XIA Feng[1], LIU Jun-xiu[1], ZENG You[2]
1. School of Materials Science and Engineering, Shenyang Jianzhu University, Shenyang 110168, China;
2. Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, Shenyang 110016, China

Abstract: An abnormal jump of emission current was observed in a single wall carbon nanotube (SWCNT) rope field emitter, in which two soda-lime glass flakes were set on both sides of SWCNT rope. It gave rise of an apparent enhancement of the emission current after the jump. All these peculiar characteristics of field emission were attributed to the modification of electric field at the presence of glass flakes and its contribution to the selective divergence of electron trajectories. Theoretic analysis and subsequently evidential investigations were carried out to certify the influence of the dimension, separation distance and dielectric constant of the dielectric medium on the I-V characteristics of SWCNT rope, which suggests a feasible way to control the field emission properties from Spindt-type emitters including CNT rope.

Keywords: carbon nanotube field emission trajectory dielectric
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通讯作者: 佟钰
作者简介: 高见(1987-), 女, 吉林吉安人, 主要从事碳纳米材料的研究。 E-mail: gj_0120@163.com
作者Email: tong_yu123@hotmail.com

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