

## 论文

### 三极场发射显示器中二次印刷型碳纳米管阴极的制备及特性

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摘要:

结合丝网印刷技术,研发了一种碳纳米管阴极制备法.利用双壁纳米管作为原材料,并加入细小银颗粒,制作了混合纳米管浆料.将混合纳米管浆料制作在传导电极表面,再将普通纳米管浆料印刷在混合纳米管浆料的上面.在链式烧结炉中对烘烤后的纳米管浆料同时进行烧结以除掉有机溶剂.在进行适当的后处理工艺之后,就形成了二次印刷型纳米管阴极,它能显著改善阴极的场致发射特性.制作了二次印刷型纳米管阴极的三极结构场致发射显示器.该显示器具有更高的发光亮度以及更好的发光图像亮度均匀性.与普通纳米管阴极场致发射显示器相比较,它能够将开启电场从2.15 V/ $\mu\text{m}$ 降低到1.75 V/ $\mu\text{m}$ ,并能够将最大场发射电流从735.8  $\mu\text{A}$ 提高到1 588.5  $\mu\text{A}$ .所研发的纳米管阴极制备方法具有很强的实际应用性,且制作成本低廉.

关键词: 阴极 二次印刷 场发射 制备 烧结

### Preparation and Characteristic of Second-printing Type Carbon Nanotube Cathode for Triode Field Emission Display

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Abstract:

With screen-printing technique, a novel carbon nanotube (CNT) cathode preparation method was developed. Using double-walled CNT as primary material, the mixing CNT paste was fabricated, in which the minute Ag particles were included. On the mixing CNT paste printed on the conducting electrode surface, the common CNT paste was prepared. The baked CNT pastes were sintered simultaneously in the chain sintering furnace to remove the organic solvent, and the second-printing type CNT cathode was formed after the proper overvoltage post-treatment process was conducted. With the fabricated second-printing type CNT cathode, the field emission characteristics could be improved significantly. The triode second-printing CNT cathode field emission display was fabricated, which exhibited higher luminous brightness and better luminescence image brightness uniformity. Comparing with the common CNT cathode field emission display, the turn-on electric field could be reduced from 2.15 V/ $\mu\text{m}$  to 1.75 V/ $\mu\text{m}$  and the maximum field emission current would be enhanced from 735.8  $\mu\text{A}$  to 1 588.5  $\mu\text{A}$ . The developed preparation method of CNT cathode possessed considerable potential for practical applications and the fabrication cost was low.

Keywords: Cathode Second-printing Field emission Preparation Sintering

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