

TRANSPARENT CARBON NANOTUBE FIELD EMISSION DEVICES FOR DISPLAY AND LAMP

*Yousuk Cho, Sunhee Lee, Myungchan An, Dojin Kim**

*School of Nano Science and Technology, Chungnam National University, Daejeon, Korea
dojin@cnu.ac.kr*

Abstract

A simple new method to fabricate transparent carbon nanotube field emission devices was developed. The highly graphitized single wall carbon nanotubes (SWNTs) were attached in-situ in an arc-discharge chamber on Sn/ITO glass substrate. The post heat-treatment carried out below the deformation temperature of soda-lime glass guaranteed good mechanical adhesion and electrical contact between the carbon nanotubes emitters and the electrode by using the particulated Sn as a bonding agency. When the Sn particles were oxidized at $<400\text{ }^{\circ}\text{C}$, the SWNT-Sn composite changes to SWNT-SnOx composite and becomes transparent. The emission current density of thus fabricated SWNT-Sn composite emitters was about 1 mA/cm^2 at $3\text{V}/\mu\text{m}$ of electric field. The emission current density of the SWNT-SnOx composite was also about 1 mA/cm^2 at the same electric field. As the oxidation temperature is higher, it showed a more stable emission property with increased life time of the emitter.

Keywords: carbon nanotube, field emission device, carbon nanotube composites, SnOx