

## Field Emission Properties of Carbon Nanotubes on Graphite Tip

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Generally, field emitters can be categorized into two types according to the emitter shape, one is a planar field emitter and the other is a point emitter. The planar field emitter is used for displays, flat lamps and signage boards. On the other hands, the point field emitter is expected to play a significant role in x-ray sources and electron beam sources. Such applications of the point field emitters, especially, need large emission current and high emission stability with a small electron beam size. A few reports announced point emitters made by carbon nanotubes (CNTs). However, they still have suffered from poor reproducibility and low emission current. Here, we demonstrated high performance CNT point emitters by attaching CNTs onto graphite rod. Graphite rod exhibited good electrical conductivity and chemical stability. In this method, the shape of the point emitter could be easily controlled by changing the length and diameter of the graphite rod. The CNT point emitter showed emission current over 1 mA at an applied electric field of 1.4 V/ $\mu$ m. We consider that the stable emission performance is attributed to the stable contact between CNTs and graphite rod.

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