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Fabrication of CNT Flexible Field Emitters and Their Field Emission Properties

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Carbon nanotubes (CNTs) have been studied as an ideal material for field emitters due to the high aspect ratio, excellent electrical property and good mechanical strength. There were many reports on CNT emitters fabricated on rigid substrates, but rare reports about CNT flexible field emitters. Recently, we considered that CNTs can be a good candidate for a flexible field emitter material because of their excellent Young's modulus and elasticity, which could not be achieved with metal tips or semiconducting nanowire tips. In this work, we demonstrated the CNT flexible field emitters fabricated by a simple method and studied the field emission properties of the CNT flexible field emitters under various bending conditions. The flexible field emitters showed stable and uniform emission characteristics. Especially, there is no remarkable change of the field emission properties at the CNT flexible field emitters according to the bending conditions. The CNT flexible field emitters also exhibited a good field emission performance like the low turn-on field and high emission current. Therefore, we suggest that the CNT flexible emitters can be used in many practical applications under different bending conditions.

Keywords: Carbon nanotubes, Flexible, Field Emission