

Abstract Submitted
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Very Stable Electron Field Emitters based on Vertically-aligned Carbon Nanotubes Embedded in Poly-methyl Metha Acrylate (PMMA) Matrix ARCHANA PANDEY, ABHISHEK PRASAD, YOKE KHIN YAP — Tremendous efforts were evidenced on the study of electron field emission from carbon nanotubes (CNTs) for more than a decade. However, commercial field emission products based on CNTs is still not available. Apparently, emission stability is one of the major issues and the understanding on this is still lacking. We have focused our efforts in understanding the basic factors that contribute towards stable field emission from CNTs. We previously reported that self-assembled conical bundles of opened-tip CNTs are stable field emitter [1]. Here, we describe a lithography free process to increase the long term emission stability of vertically-aligned multiwalled carbon nanotubes (VA-MWCNTs). We found that the emission threshold (E_{th}) of VA-MWCNTs was reduced by more than two-fold when VA-MWCNTs were embedded in PMMA. These emitters were tested for continuous emission at a current density $>1.2\text{mA}/\text{cm}^2$ for 40 hours with $>96\%$ stability and emission density. Multiple theoretical models and simulation were conducted to explain these observations. Details of these analyses will be presented in the meeting.[1] Pandey et al, Carbon 48, 287 (2010) + cover image in the 48/3 issue (2010). Y. K. Yap acknowledges supports from DARPA (DAAD17-03-C-0115).

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