

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Electron emission from functionalized carbon nanotubes and its thermionic cooling effect FENG JIN, Ball State University, SCOTT LITTLE, GUOGANG QIANG — Thin film of carbon nanotubes (CNTs) were grown on metal foil substrates using plasma enhanced CVD technique. The surface of the CNTs was further functionalized by sputter deposition a thin layer of low-work function barium strontium oxide. Strong thermionic emission was observed from these functionalized CNTs thin film. The electron emitted were mostly hot electrons which carried energy away from the emitting surface. A large thermionic cooling effect was observed. Temperature drops as large as 100 C was observed. The detail characterization of the electron emission properties of these functionalized CNTs including work function will be presented. The thermionic cooling effect or temperature drops at various initial temperatures and emission currents will also be presented. The potential to use this functionalized CNTs thin film as a micro thermionic cooler will also be discussed.

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Date submitted: 20 Nov 2009

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