

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Field Enhanced Thermionic Electron Emission From a New Oxide Coated Carbon Nanotube Cathode** FENG JIN, Ball State University, CHRISTOPHER DAY, Ball State University — We will report high field enhanced thermionic electron emission from a new type of oxide coated carbon nanotube cathode. This cathode consists of a metal substrate with carbon nanotubes grown on top of its surface by plasma enhanced CVD technique. The carbon nanotubes are further coated with thermionic emission materials (BaO/SrO/CaO). Oxides are coated on carbon nanotubes by magnetron sputter deposition and spin coating techniques. The emission current density from this cathode is at least an order of magnitude higher than conventional thermionic cathode coated with same emission materials and operated at same temperature. This strong emission current is attributed to the field enhancement effect. Field enhancement effect is usually negligible for conventional thermionic cathodes. However, in this case significant field enhancement thermionic emission is induced by sharp carbon nanotubes tips. We will present comparison results on electron emission for three different cathodes: 1) oxide coated carbon nanotube cathode, 2) conventional oxide cathode, and 3) carbon nanotube cathode.

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Date submitted: 28 Nov 2004

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