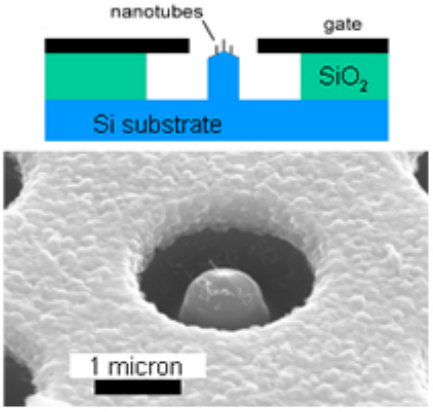
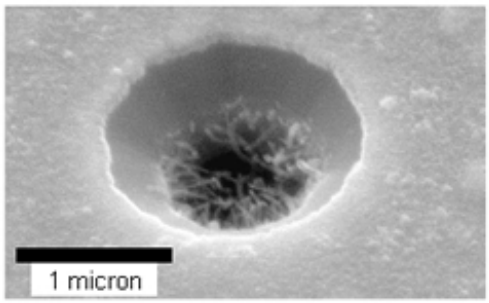
NAVAL RESEARCH LABORATORY

TECHNOLOGY LICENSING OPPORTUNITY

TRIODE CARBON NANOTUBE ELECTRON SOURCES





The Naval Research Laboratory has developed field emitter arrays (FEAs) based on integrally gated carbon nanotubes (CNTs). Electrons are produced via field emission from *in-situ* grown CNTs on microfabricated gated post structures (above left) or in gated open apertures (above right). Very low operating voltages, chemically stable CNT surface, and lack of electrical arcing make these more robust than conventional FEAs.

Available for License: US Patent Nos. 7,535,014 and 7,919,338.

Advantages/Features

Operating voltages 3X lower than conventional FEAs (20-60V versus 70-150V

Very low gate current (<2.5% anode current)

Highly stable emission; no electrical arcing Maximum current density comparable to or greater than conventional FEAs

Maximum current density comparable to or greater than conventional FEAs

Insensitive to dulling by ions compared to conical designs

Low capacitance due to arbitrarily tall base (i.e. post) structure

Emission increases (> 10x) with exposure to water vapor, hydrogen, or high temperature

Fewer processing steps = reduced fabrication costs

Applications

Flat panel displays

X-ray generation (especially suited for miniaturization)

High voltage power grid switches and high temperature electronics

High frequency amplifiers

Mass spectrometers (especially suited for miniaturization)

Multi-beam electron lithography

Satellite propulsion and charge neutralization

Cold electron sources with low input power requirements

For more information contact:

Rita Manak, Ph.D.
Head, Technology Transfer Office

202 767-3083

rita.manak@nrl.navy.mil

Identification Number: