Abstract Submitted
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Investigation of Electron Emission within Arc Cathodes[1] MITCH EAGLES, YEVGENY RAITSES, Princeton Plasma Physics Lab — Arc discharges have significant applications in the synthesis of carbon nanostructures, especially single-walled carbon nanotubes. Electron emission in arc discharges is currently thought to occur largely due to thermionic emission. Theory suggests, however, that the temperature of the cathode must be over 3000 K in order to produce a high enough electron current to sustain the arc. This clearly conflicts with the use of copper, iron, and many other materials with melting points well below 3000 K as cathodes. Such cathodes do not significantly melt during the arc, indicating that thermionic emission cannot be the only source of electron emission. An investigation of non-thermionic emission methods is conducted, including field emission and secondary electron emission. Results will be presented.

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