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Enhanced ablation of small anodes in a carbon nanotube arc discharge[1] YEVGENY RAITSES, ABRAHAM FETTERMAN, Princeton Plasma Physics Laboratory, MICHAEL KEIDAR, George Washington University — An atmospheric pressure helium arc discharge is used for carbon nanotube synthesis. The arc discharge operates in an anodic mode with the ablating anode made from a graphite material. For such conditions, models predict the electron-repelling (negative) anode sheath. In the present experiments, the anode ablation rate is investigated as a function of the anode diameter. It is found that anomalously high ablation occurs for small anode diameters (< 0.4 cm). This result is explained by the formation of an electron-attracting (positive) anode sheath leading to increased power losses on small anodes as compared to larger anodes [1]. The suggested mechanism for the positive anode sheath formation is plasma convergence. The increased ablation rate due to this positive sheath could imply a greater yield of carbon nanotube production. [1] A. J. Fetterman, Y. Raitses and M. Keidar, Carbon (2008).

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