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Electrical characteristics and cathode deposit growth in an anodic arc producing carbon nanotubes MICHAEL KEIDAR, ALEXEY SHASHURIN, George Washington University, YEVGENY RAITSES, Princeton Plasma Physics Laboratory — Voltage-current (V-I) characteristics of the carbon nanotube producing anodic arc are measured for different gap sizes, anode compositions and background He pressures. It is shown that voltage-current characteristics has V-type shape and with increasing of the gap V-I characteristic shifts to the higher arc voltages, while minimum shifts to higher arc currents. The increasing the metallic catalyst fraction in the anode composition leads to slight decrease in the arc voltage and shifts the minimum position to higher arc currents. Such shape of the voltage current characteristics is explained by superposition of two effects: decreasing of the potential drop in the quasineutral plasma column and increasing of the anode potential drop with arc current. In addition two effects regarding cathode deposit growth in the anodic arc producing carbon nanotubes are reported. First, decreasing of the cathode deposit growth rate with interelectrode gap increase and second, increasing of the cathode deposit diameter with arc current increase. Both effects are explained by invoking the argument that the interelectrode plasma is necessary to trigger the growth of the cathode deposit.

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