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Atmospheric Pressure Plasma Jet Process for Carbon Nanotube growth ANAND CHANDRASHEKAR, JEONG SOO LEE, GIL SIK LEE, LAWRENCE OVERZET, University of Texas at Dallas — In this study, an atmospheric jet RF helium plasma (13.56 MHz) is used to synthesize Carbon nanotubes on large area silicon substrates, using acetylene precursor gas. Downstream, a copper hot plate is heated to temperatures of 600C and above, after the substrate is set on it. Iron (catalyst) is either evaporated on the substrate and annealed, or added to the process by evaporating ferrocene in a Vapor Delivery System (VDS). The plasma and thermal energy dissociate the precursor molecules, and carbon nanotubes deposit on the substrate. SEM micrographs of film cross-section predict that taller nanotubes can be obtained at higher plate temperatures and plasma powers. Film growth saturates with time if only pre-evaporated iron catalyst is used, but this phenomenon is overcome by introducing ferrocene. It was determined using Raman spectroscopy that higher plasma power and temperature lend purer nanotube films, due to efficient graphitization.

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