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Electrospray-assisted carbon nano tube deposition on aluminum without a binding agent[1] SUBHODIP MAULIK, SRISMRITA BASU, THEDA DANIELS-RACE, Louisiana State Univ - Baton Rouge, APPLIED HYBRID ELECTRONIC MATERIALS AND STRUCTURES (AHEMS) LABORATORY TEAM
— Carbon nanotubes (CNTs) are known for their exceptional properties of electrical conductivity, thermal tolerance, and tensile strength. Observation of CNT-based electronic phenomena often begins with a pre-treated or otherwise functionalized metal or semiconductor surface. For example, although successful deposition of CNTs onto aluminum (Al) has been reported in the literature, the steps usually involve some form of chemical vapor deposition (CVD) and pretreating the Al with a thin film catalyst (e.g., nickel), which can be costly and labor-intensive. In our work, we have investigated electrospraying as a method of CNT deposition that replaces CVD and does not require a surface binding agent to produce high quality CNT coverage. The electrospray is created when droplets of isopropyl alcohol saturated with CNTs are subjected to voltages in the 5-8 kV range while being deposited upon a non-functionalized Al surface. The enhanced charge density overcomes droplet surface tension to distribute CNTs via the liquid in the shape of a Taylor cone that is characteristic of electrospraying. Raman spectra verify deposition of multi-wall CNTs while examination via optical microscope shows appreciably uniform coverage using our electrospray-assisted method.

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