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UHV-Compatible Aerosol-Molecule Beam Deposition Source for Organic Electronic Films¹ LEVAN TSKIPURI, QIAN SHAO, JANICE REUTT-ROBEY, University of Maryland — The rapidly advancing technologies of flexible electronics and organic photovoltaics have triggered strong interest in new methods for electronic materials deposition from the solution phase. Materials deposition based upon direct aerosol flow offers advantages both for fundamental studies of film growth and analysis and for industrial preparation of high-performance materials. We describe an aerosol deposition source based upon a spray-jet molecular beam technique. The source produces a supersonic molecular beam of solutes (such as C₆₀PCBM ([6,6]-phenyl-C₆₁-butyric acid methyl ester) or graphene flakes) in $\sim 10 \mu$ solvent droplets entrained in a nitrogen carrier gas. The twice-differentially pumped source is then mated to a UHV-STM system, for fundamental studies. The source has been used to generate films of C₆₀PCBM, CNT's, and graphene/PPV composites on SiO₂ and mica substrates. The spray-jet deposition provides much greater control of the growth kinetics, relative to conventional spin-coating, permitting films to be grown with submonolayer control, as we demonstrate in the growth of C₆₀PCBM films.

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