

Deposition Characteristics and Electrical Properties of Silver and CNT Inks Deposited by Aerosol Jet

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Abstract

3D printing on the microscale has the ability to significantly reduce fabrication time of MEMS devices allowing for more innovation between design cycles. Another advantage provided is the conservation of material during printing. For example, instead of sputtering metal onto a surface and then removing the majority of it, direct and targeted deposition allows only the necessary metal to be printed onto the substrate. Specifically, aerosol jet printing allows the deposition of features and lines down to 10 μm . This poster will focus on the physical and electrical properties of a silver ink and a carbon-nanotube (CNT) ink printed using aerosol jet deposition. The resistivity of the inks is analyzed for deposition of lines constructed from a varying number of passes of the printer. This method has been shown to achieve around 35x the bulk resistivity of silver itself. Interestingly, the resistivity appears to vary with the number of passes in which the line is deposited. The main plots shown on the poster will include resistivity vs. Ag/CNT inks for a defined structure and the effects of aging through baking at elevated temperatures. Aging in some cases has improved the electrical conductivity of the structure, potentially by baking out extra solvent and improving the sinter of the material.