Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

Direct Writing of Copper Using an FE-DBD Jet for Epidermal Electronics MATTHEW BURNETTE, DAVID STAACK, Texas AM Univ — Epidermal electronics is a growing field where electronic devices are placed directly onto human skin. These electronic devices have strict requirements of adhesion to the skin, biocompatibility, and high flexibility while still maintaining operability. This project seeks to develop a low temperature plasma-based deposition method for epidermal electronic applications. A helium floating-electrode dielectric barrier discharge jet is attached to the head of a three-dimensional printer, making a direct write system capable of depositing complex patterns onto substrates. A radio-frequency power supply is used to ignite the discharge. Copper patterns are deposited on various substrates including pig skin as a surrogate human skin model using sublimated copper (II) acetylacetonate as a precursor. A small admixture of hydrogen is necessary to achieve any copper deposition. Factors affecting the deposition (hydrogen and helium flow rates, copper precursor temperature, discharge power, etc.) are explored to maximize the deposition rate.

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Date submitted: 17 Jun 2020 Electronic form version 1.4