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The injection of microorganisms into an atmospheric pressure rf-driven microplasma[1] P.D. MAGUIRE, C.M.O. MAHONY, University of Ulster, D. DIVER, University of Glasgow, D. MARIOTTI, University of Ulster, E. BENNET, H. POTTS, University of Glasgow, D.A. MCDOWELL, University of Ulster
— The introduction of living organisms, such as bacteria, into atmospheric pressure microplasmas offers a unique means to study certain physical mechanisms in individual microorganisms and also help understand the impact of macroscopic entities and liquid droplets on plasma characteristics. We present the characterization of an RF-APD operating at 13.56MHz and containing microorganisms in liquid droplets emitted from a nebulizer, with the spray entrained in a gas flow by a gas shroud and passed into the plasma source. We report successful microorganism injection and transmission through the plasma with stable plasma operation of at least one hour. Diagnostics include RF electrical characterization, optical emission spectrometry and electrostatic deflection to investigate microorganism charging. A close-coupled Impedans Octiv VI probe indicates source efficiencies of 10 to 15%. The introduction of the droplets/microorganisms results in increased plasma conductivity and reduced capacitance, due to their impact on electron density and temperature. An electrical model will be presented based on diagnostic data and deflection studies with input from simulations of charged aerosol diffusion and evaporation.

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