

Akos Vertes

George Washington University

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In this project we explore how electric fields facilitate the dispersion of liquids into charged micro and nanodroplets. The process starts with the deformation of the liquid meniscus at the end of a capillary. Through complex dynamics, this shape change results in the ejection of a thin jet that eventually breaks into fine droplets. Due to their charge, these droplets undergo several generations of fission and ultimately ejections of the dissolved material. Our work revealed the effect of capillary waves on the electro spray current and the role of solvated ion evaporation in the charge reduction of nanodroplets. Cyber-enabled mass spectrometers are used to study the chemical composition of the ejected droplets. Electro sprays have diverse applications including protein analysis, steering of microsattellites in space and nano-encapsulation for drug delivery.

