Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Study on Electric field assisted low frequency (20 kHz) ultrasonic spray[1] ILKYEONG CHAE, BAEKHOON SEONG, DARMAWAN MARTEN, DOYOUNG BYUN, Sungkyunkwan Univ. — Ultrasonic spray is one of the fabulous techniques to discharge small size of droplets because it utilizes ultrasonic vibration on nozzle. However, spray patterns and size of ejected droplet is hardly controlled in conventional ultrasonic spray method. Therefore, here we present electric field assisted ultrasonic spray, which combined conventional technique with electric field in order to control spray pattern and droplet size precisely. Six kinds of various liquid (D.I water, Ethanol, Acetone, Iso-propanol, Toluene, Hexane) with various dielectric constants were used to investigate the mechanism of this method. Also, PIV (Particle Image Velocimetry) was used and various variables were obtained including spray angle, amplitude of liquid vibration, current, and size distribution of ejected droplets. Our electric field assisted ultrasonic spray show that the standard deviation of atomized droplet was decreased up to 39.6%, and it shows the infinite possibility to be utilized in various applications which require precise control of high transfer efficiency.

[1]This work was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (2014-023284)

Ilkyeong Chae
Sungkyunkwan Univ.

Date submitted: 30 Jul 2015 Electronic form version 1.4