

Abstract Submitted  
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**Relationship between current waveform and Taylor cone tip vibration in Trichel-like pulse discharge from liquid-filled nozzle electrode**<sup>1</sup> FUMIYOSHI TOCHIKUBO, KEISUKE NAGAO, YUSUKE NAKAGAWA, SATOSHI UCHIDA, Tokyo Metropolitan Univ — Electrospray as a common tool for the source of fine liquid droplets is formed by applying a high voltage between a liquid-filled nozzle electrode and a plate electrode. When a negative high voltage is applied to the liquid-filled nozzle electrode, Trichel-like pulse discharge is generated simultaneously with the electrospray. In Trichel-like pulse discharge, current pulse groups repeatedly and regularly appear with intervals. In each pulse group, a number of current pulses with duration shorter than 200 ns follow a large initial pulse with an increase in their height and interval<sup>(1)</sup>. The shape of pulse group as well as droplet emission strongly depends on both discharge and liquid conditions. In this work, we experimentally investigated the current waveform of Trichel-like pulse discharge as parameters of applied voltage, discharge gap, conductivity and viscosity of liquid. The vibration of Taylor cone tip as well as droplet emission was observed by a high speed camera synchronized with the current waveforms. The tip of Taylor cone vibrates with a displacement of 20-40  $\mu\text{m}$  synchronized with the frequency of pulse group appearance, which is influenced by the liquid viscosity. (1)T. Sugimoto et al., *J. Electrostat.* **53** (2001) 25.

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