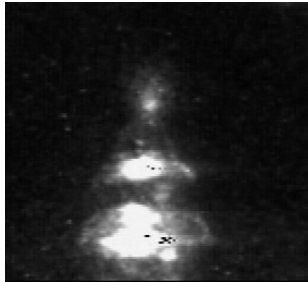


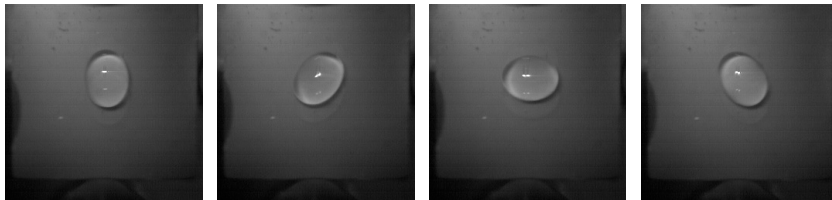
Discharge Phenomena and Motion Control of a Water Drop by Electric Field

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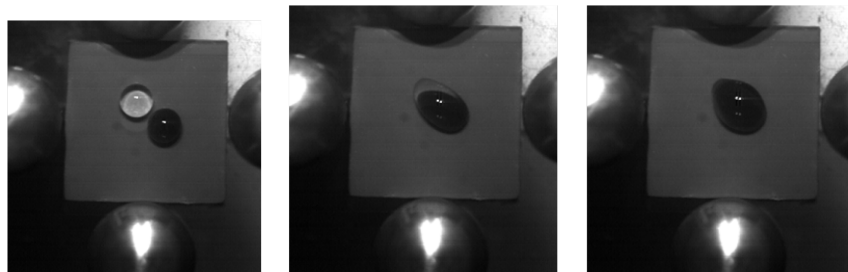
Fine water jet with negative ions are emitted from the cone-like tip of a water droplet with negative corona discharge involving with regular resonant vibration.

Corona discharge occurring at the tip of water droplet



0 5.5ms 11ms 16.5ms

Clock-wise rotation of 30 μ L droplet located at the insulating plate under orthogonal ac electric field.



0 0.65 s 1.3 s

Two water droplets are mixed by a rotational electric field.

Content:

Electrohydrodynamic property and application of s of a small water droplet under dc or ac electric field has been investigated. A single water droplet under an ac field vibrates strongly only at the particular frequency range, which corresponds to resonant vibration with natural frequency of the droplet. A single water droplet located at the tip of point electrode or on a hydrophobic surface under an ac field manifests resonant vibration at a particular frequency. From the tip of a water droplet located at a negative point electrode, corona discharge occurs at regular interval corresponding to its resonant frequency. In addition, a number of fine droplets including nitric acid are ejected from the tip of a droplet. This EHD phenomena leads to application for a non-contact electrostatic stirring apparatus. Since resonant vibration of the water droplet involves with significant deformation of its shape and dynamic flow in liquid inside of the droplet, it could inevitably promote mixing two or several droplets.

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