Abstract Submitted
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Atmospheric negative corona discharge using a Taylor cone as liquid electrode[1] RYUTO SEKINE, NAOKI SHIRAI, SATOSHI UCHIDA, FUMIYOSHI TOCHIKUBO, Tokyo Metropolitan University, TOKYO METROPOLITAN UNIVERSITY TEAM — We examined characteristics of atmospheric negative corona discharge using liquid needle cathode. As a liquid needle cathode, we adopted Taylor cone with conical shape. A nozzle with inner diameter of 10 mm is filled with liquid, and a plate electrode is placed at 10 mm above the nozzle. By applying a dc voltage between electrodes, Taylor cone is formed. To change the liquid property, we added sodium dodecyl sulfate to reduce the surface tension, sodium sulfate to increase the conductivity, and polyvinyl alcohol to increase the viscosity, in distilled water. The liquid, with high surface tension such as pure water could not form a Taylor cone. When we reduced surface tension, a Taylor cone was formed and the stable corona discharge was observed at the tip of the cone. When we increased viscosity, a liquid filament protruded from the solution surface was formed and corona discharge was observed along the filament at position 0.7-1.0 mm above from the tip of the cone. Increasing the conductivity resulted in the higher light intensity of corona and the lower corona onset voltage. When we use the metal needle electrode, the corona discharge depends on the voltage and the gap length. Using Taylor cone, different types of discharges were observed by changing the property of the liquid.

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