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Understanding of Non-Thermal Atmospheric Pressure Plasma Characteristics Produced in Parallel Plate Type Geometry

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Non-thermal atmospheric pressure plasmas have recently garnered much attention due to their unique physical and chemical properties that are sometimes significantly different from those of low pressure plasmas. It can offer many possible application areas including nano and bio/medical areas. Many different types of plasma sources have been developed for specific needs, which can be one of the important merits of the atmospheric pressure plasmas since characteristics of the produced plasma depend significantly on operating parameters such as driving frequency, supply gas type, driving voltage waveform, gas flow rate, gas composition, geometrical factor etc. Among many source configurations, parallel plate type geometry is one of the simplest configurations so that it can offer many insights for understanding basic underlying physics. Traditionally, the parallel plate type set up has been studied actively for understanding low pressure plasma physics along with extensive employment in industries for the same reason. By considering that understanding basic physics, in conjunction with plasma-surface interactions especially for nano & bio materials, should be pursued in parallel with applications, we investigated atmospheric pressure discharge characteristics in a parallel plate type capacitive discharge source with two parallel copper electrodes of 60 mm in diameter and several millimeters in gap distance. In this presentation, some plasma characteristics by varying many operating variables such as inter-electrode distance, gas pressure, gas composition, driving frequency etc will be discussed. The results may be utilized for plasma control for widening application flexibility.