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DC Non-thermal Atmospheric-pressure Plasma Jet Generated by Syringe Needle Electrode KHANIT MATRA, Srinakharinwirot University — In this paper, non-thermal plasma jet operated in the atmospheric-pressure environment is presented. Plasma jet is generated by applying dc source voltage between 1.2 mm of inner diameter syringe needle anode with flowing Argon gas and planar or hollow copper cathode. Two operating discharge modes, which are self-pulsing discharge and continuous discharge mode, are mainly controlled by the limitation of current flowing in the discharge circuit. Rated current flowing in the circuit and ballast resistor (800 kiloohm and 1 Megaohm ballast resistors are chosen in this research) are important factors affecting on the limitation of operating discharge mode. Gas breakdown are initially generated in the self-pulsing discharge mode at the source voltage of 1.2 kV, which is slightly higher than the breakdown voltage, at the experimental condition of Argon gas flow rate of 1 LPM and electrode gap distance of 1 mm. The self-pulsing discharge currents are up to 15-20 amperes with self-pulsing frequency in the range of 10-20 kHz. The continuous discharge mode could be observed at the higher source voltage, compared with those of self-pulsing discharge mode, with the continuous discharge current in the range of a few milliamperes.

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