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Plasma Propagation Speed and Electron Temperature of Atmospheric Pressure Non-Thermal Ar Plasma Jet

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Space and time resolved discharge images from an atmospheric pressure non-thermal Ar plasma jet have been observed by a ICCD camera to investigate the electron temperatures. Plasma jet device consisting of a syringe electrode inserted into a glass tube has been introduced. A high voltage is applied to the syringe electrode. The syringe needle has an outer diameter of 1.8 mm, an inner diameter of 1.3 mm, and a total length of 39.0 mm. The needle is inserted into a glass tube of outer diameter 2.4 mm and inner diameter 2.0 mm, and a total length of 80.0 mm. The Ar plasma propagation speed on the cathode has been shown to be about 2.1 km/s at input discharge voltage of 3.6 kV, discharge current of 19.9 mA and driving frequency of about 45 kHz. Particularly, the electron temperature in plasma jet were found to be about 1.8 eV at input discharge voltage of 3.6 kV and driving frequency of 45 kHz, respectively.

Keywords: Plasma, Plasma jet, ICCD, Plasma propagation, Electron temperature

