MULTI-JETS ATMOSPHERIC PRESSURE HELIUM COLD PLASMA IN AIR

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Biomedical applications[1] of cold plasma at atmospheric pressure attracted many researchers to search for new sources of cold plasmas. A Novel single electrode system, generates helium multi jets AC atmospheric pressure cold plasmas in air, is presented in this work. The system is consisted of a cylindrical alumina (Al_2O_3) insulator tube with outer diameter of ~4.5 mm and 80 mm length. The tube has two capillaries of the same hole diameter (1.5 mm) and their centers are separated by 2 mm. A sinusoidal voltage was applied to a copper ring single electrode surrounding the alumina tube and located at 2 cm for the tube end. The current signal shows a peak to peak current value under 10 mA indicating that the generated plasma jet is homogenous. The generated plasma can be touched safely which indicates its non-thermal neutrality. The spectroscopic measurements of the plasma rotational temperature confirmed that the jet has a temperature near to room temperature. The plasma jets showed a diverging behavior by increasing the applied voltage. Moreover, the jets length increases with increasing flow rate or the applied voltage and then it saturates with an incline to decrease again at higher flow rate values. This system proves its concept for four plasma jets and also for multi jets system. These results indicate that this system can be used for plasma sterilization for large area treatment such as the carpet cleaning system.

1 F. Iza, G. J. Kim, S. M. Lee, J. K. Lee, J. L. Walsh, Y. T. Zhang, and M. G. Kong, "Microplasmas: Sources, Particle Kinetics, and Biomedical Applications," *Plasma Process. Polym.*, vol. 5, pp. 322-344, Apr. 2008.