Electronic Letters on Science & Engineering 12 (2) (2016)
Available online at www.e-lse.org

Special Issue
BSW2016
Fifth Bozok Science Workshop: Nano Carbon Materials and Their Applications

Bozok Science Workshop 2016, Yozgat, April 28-29, 2016.

ELECTRICAL AND OPTICAL EXPLORATIONS OF A NEW ATMOSPHERIC PLASMA DEVICE

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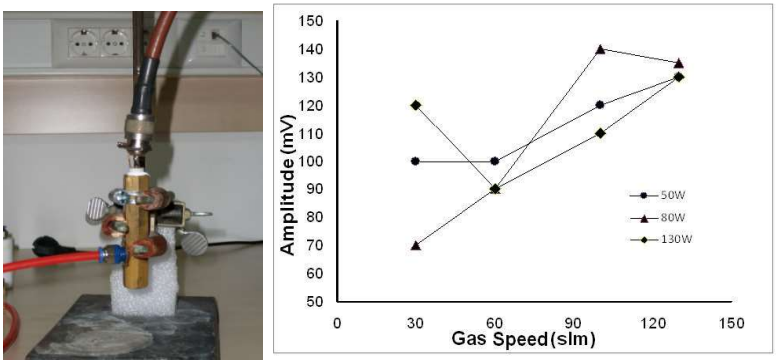
Abstract: An Atmospheric Pressure Plasma Jet (APPJ) system which works under the atmospheric pressure has been designed and constructed. The system is operated at 13.6 MHz and produces cold plasma with 1 - 4 eV. The preliminary explorations have proven that the system can operate under a varied flow rate of *He* media. According to the preliminary measurements, a plasma current around 0.38 - 0.76 A has been measured. By using an IR camera, the plasma temperature is found as T = 28˚C. According to the optical measurements, the reactive species such as OH, O, N, N_2 have been detected experimentally via an optical emission spectrometer. The APPJ device is proposedfor surface disinfection, since the produced plasma is harmful for the bacterial. The experimental setup is given in Fig. 1(a) and the resulting plasma amplitude measured by a Rogowski coil is given in Fig. 1(b). There exists a overall increasing trend in amplitude by gas speed.



(a) (b)

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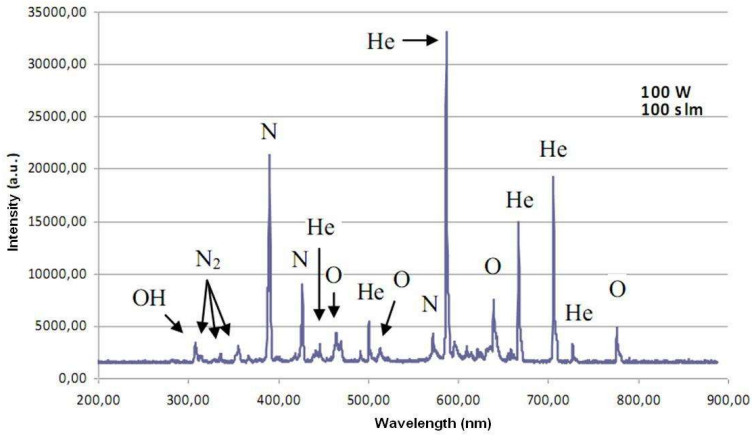
ISSN 1305-8614



(c)

Figure 1(a) The designed APPJ system and the gas and RF source connections.(b) The variation of plasma amplitude with respect to gas speed.(c) Optical spectroscopy of the plasma

The optical observations proves that the plasma produces many ionized ions as in Fig. 1(c).

Keywords: *Electrical and optical explorations; Atmospheric plasma device.*
