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Optical Emission Study of a Direct-Current, Atmospheric-Pressure Non-Thermal Plasma Microjet[1] WEIDONG ZHU, JOSE L. LOPEZ, CMST - Saint Peter's College, KURT H. BECKER, Polytechnic Institute of New York University, CMST - SAINT PETER'S COLLEGE TEAM, POLYTECHNIC INSTITUTE OF NEW YORK UNIVERSITY TEAM — This work aims to study a direct-current driven, atmospheric-pressure non-thermal plasma microjet (PMJ) operated in air with mixtures of He or He/O_2 as the working gases with a typical current of 5-40 mA and a gas flow rate of 2-5 slm. Optical emission spectra were taken from end-on and in some cases from side-on (at different distances from the exit nozzle). End-on spectra show major He emission lines as well as weak emissions the N_2 2^{nd} positive system ($C^3\Pi_u$-$B^3\Pi_g$). Strong atomic oxygen emission was also observed. Similar emissions were observed when the He/O_2 PMJ was submerged in water. The strong emission of oxygen can result from direct He* penning ionization of O_2 molecules followed by the electron-impact dissociation of O_2^+. The relative intensity of the oxygen was found to increase with the increase of the operating current and peaked at an O_2 volume concentration of 0.1%-0.3%.

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