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Determination of OH radicals in the far downstream of an atmospheric pressure microwave helium plasma jet[1] NIMISHA SRIVASTAVA, CHUJI WANG, Department of Physics & Astronomy, Mississippi State University, MS, US — A recent study has reported observation of OH radicals in the far downstream of an atmospheric argon microwave plasma jet. The far downstream is referred to as the location where the ratio of the distance from the jet orifice to the length of the jet column is > 3. In this work we report that this phenomenon also exists in a similar plasma jet of 2.5 mm long, operating by helium gas. A detailed characterization of the helium microwave plasma jet was carried out by using UV pulsed cavity ringdown spectroscopy and optical emission spectroscopy. The non-thermal plasma temperatures were determined from stimulations of the emission spectra of several vibronic bands of the 2^{nd} positive system of N_2, the 1^{st} negative system of N_2^+, the (0,1,2,3-0) bands of NO (A-X), and the (0-0) band of OH (A-X). Absolute number densities of OH were measured along the plasma jet column. Dependence of OH concentration on plasma power and gas flow rate at different locations along the jet axis was characterized. The electron densities were also measured by recording Stark broadening of the hydrogen Balmer beta line (H_β) at 486.1 nm.

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