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**Spectroscopic diagnostics of microwave excited atmospheric pressure Ar plasma jet in open air** KEIGO TAKEDA, MINEO HIRAMATSU, Meijo University, KENJI ISHIKAWA, MASARU HORI, Nagoya University — A microwave excited atmospheric pressure plasma jet (APPJ) with Ar gas was used to produce a plasma activated medium (PAM) for the cancer cell treatment in our group, as result, the antitumor effect of microwave excited PAM was stronger than the conventional PAM produced by an AC-excited Ar gas APPJ. For the APPJ treatment in atmosphere, the gas-phase reaction of APPJ with ambient air is an important issue for understanding the generation mechanism of reactive species. In this study, spectroscopic diagnostics of microwave excited Ar gas APPJ in open air was performed to understand the gas-phase reactions. Firstly, the gas temperature and the electron density of APPJ were estimated to be about  $10^{14} \text{ cm}^{-3}$  and 1000 K by fitting the emission spectra of Balmer- $\beta$  line of H atom and 2nd positive band of  $\text{N}_2$ , respectively. And then the metastable Ar atom density generated by the APPJ in open air was measured by laser diode absorption spectroscopy. As result, the density decreased from  $10^{11}$  to  $10^{10} \text{ cm}^{-3}$  with the increase in the Ar gas flow rate. It is considered that collisional quenching of metastable Ar atom with ambient air molecules increases with increasing the flow rate.

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