

# 大気圧プラズマジェットによるラジカル生成に及ぼす電極配位の効果

## Effect of Electrode Configuration on Radical production by Atmospheric Plasma Jet

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Introduction: Atmospheric pressure plasma jet has been gathering much attention in various field such as environmental and biological field. For industrial application, however, current plasma jet source [1] has many drawbacks. Among them, its running cost (helium gas) is not economical. A small diameter rod electrode helps discharge of argon gas at low applied voltage with field concentration effect [2]. Its effect on radical production is, however, still an open question.

Experiments and results : In this study, reactive oxygen species (ROS) production is investigated with Polyvinyl Alcohol-Potassium Iodide (PVA-KI) chemical probe [3].

PVA-KI has been studied by our group as a new chemical probe with high sensitivity and safety. Iodine ion is oxidized by ROS, and it is captured by PVA molecular and form a complex. Color change during this process depends on many experimental factors. For example, produced PVA-KI sample must be stored in the refrigerator. Otherwise, old sample shows different color change from the radiation dose measurement literatures.

Recently, two plasma sources with different electrode configurations are constructed for other experimental research. Used gas is helium and the same low frequent (10 kHz) power source is used.

Plasma irradiation with type A shows red or orange color according to irradiation time. Absorbance spectra of irradiated sample has a peak around 490 nm. These result agrees with radiation literatures. On the other hand, when type B is used, PVA-KI sample shows yellow color and its absorbance spectra is also different. We are checking electrode effect on plasma parameters and monitoring the sample environment such as solution temperature.

Some of these results will be discussed at the meeting site. This work was supported by the ZE Research Program, IAE (ZE31B-23), and the joint usage / research program, cLPS(19022).

references : [1] M.Teschke, et al.: IEEE Trans. Plasma Sci. 33, 310(2005). [2] H. Matsuura et al.: Plasma Medicine 4(1-4), 29-36 (2014). [3] 松浦寛人; 第36回プラズマプロセッシング研究会 PA-02(2019)/第80回応用物理学会春季学術講演会, 12a-PB1-8(2019).

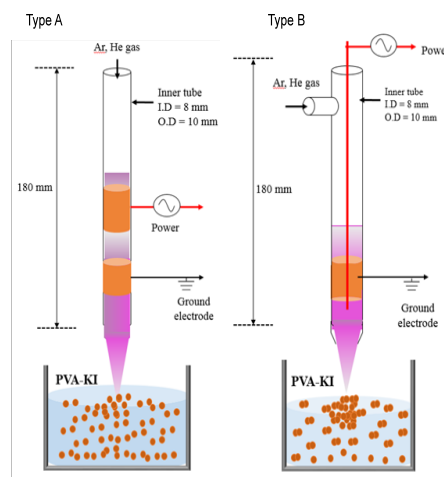


図 1: Two types of electrode configurations are shown. Type A: Co-axial two ring electrodes (powered and grounded ones). Type B: A centered needle powered electrode and a ring grounded one.