

Abstract Submitted  
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**Experimental Study on Atmospheric Pressure RF Capacitive He/CF<sub>4</sub>/O<sub>2</sub> Discharges** TAKASHI KIMURA, TAKAMASA HANAI, Nagoya Institute of Technology — Electrical and optical measurements of atmospheric pressure capacitive radio frequency (13.56 MHz) He/CF<sub>4</sub>/O<sub>2</sub> discharges were carried out by changing the mixture composition of CF<sub>4</sub> and oxygen at the fixed He content of 99%. Those discharges were produced between two planar electrodes of 40mm- $\phi$  at the gap length of 1.0 mm. The impedance of the discharge gradually decreased as oxygen was mixed to He/CF<sub>4</sub> discharges, and then reached the minimum around the oxygen content of 0.1%, beyond which it increased with increasing oxygen content. Optical emission spectroscopy has been used in order to observe the excited species generated in the capacitive He/CF<sub>4</sub>/O<sub>2</sub> discharges. Optical emission spectra used in this study exhibit emission lines of excited Ar, O and F atoms. The intensity at 704 nm emitted from the excited atomic fluorine increased markedly as oxygen was mixed to CF<sub>4</sub> discharges, and then reached the maximum around the oxygen content of 0.2 - 0.3%, beyond which it decreased with increasing oxygen content. The intensity at 845 nm emitted from the excited atomic oxygen was also investigated in order to grasp the dependence of the atomic oxygen density on the oxygen content. The intensity at 845 nm was approximately proportional to O<sub>2</sub> content, resulting in the linear relationship between the atomic oxygen density and the O<sub>2</sub> content.

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