

Abstract Submitted  
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**Properties of capacitive He/SF<sub>6</sub>/O<sub>2</sub> and He/CF<sub>4</sub>/O<sub>2</sub> discharges at atmospheric pressure** TAKASHI KIMURA, HIROKI TANAHASHI, Nagoya Institute of Technology — Electrical and optical measurements of atmospheric pressure capacitive radio frequency (13.56 MHz) He/SF<sub>6</sub>/O<sub>2</sub> and He/CF<sub>4</sub>/O<sub>2</sub> discharges are carried out at the mixture compositions of fluorine compound gas and oxygen of 0.5%. Those discharges are produced between two planar electrodes of 40mm- $\phi$  at the gap length of 1.0 mm in the dissipated power range from 40W to 180W. The total flow rate of helium and reactive gases is kept at 7( $\ell$ /min), and the small amount of Ar (= 10 sccm) is also fed in order to estimate the atomic fluorine density by actinometry. From the measured waveforms of the applied voltage and the RF current, the atmospheric pressure He/CF<sub>4</sub>/O<sub>2</sub> discharges are capacitive, whereas the He/SF<sub>6</sub>/O<sub>2</sub> discharges are greatly resistive at most of our experimental conditions. The atomic fluorine density in those discharges should be estimated by actinometry, where the intensities at 704 nm emitted from the excited atomic fluorine and 750nm emitted from the excited Ar are used. The atomic fluorine density increases markedly with increasing oxygen content, and then reaches each maximum when the ratio of the oxygen content to the sum of the oxygen and fluoride compound gas contents is around 0.2-0.5. The atomic fluorine density in those discharges is on the order of  $10^{14}$  cm<sup>-3</sup>. This work was supported in part by Research Foundation for the Electrotechnology of Chubu.

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