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A measurement of F metastables by laser absorption spectroscopy in a two frequency CCP KENJI HAYASHI, TAKESHI OHMORI, TAKUMI AKAIKE, Keio University, TAKESHI KITAJIMA, National Defense Academy, TOSHIAKI MAKABE, Keio University, KEIO UNIVERSITY TEAM, NATIONAL DEFENSE ACADEMY TEAM — Fluorine-containing plasmas are used in SiO_2 etching. The degree of dissociation of CF_4 is a critical factor for bottom etching and sidewall polymer deposition and determines the absolute density of F atom. Relative density is of F atom in metastables and grand state are experimentaly reported in an ECR plasma[1]. In the present study, we have observed the absolute density of F metastables by using a tunable diode laser absorption spectroscopy(LAS) in a capacitively-coupled plasma (CCP) in Ar/CF_4. The transition line used for absorption spectroscopy of F metastables is $3s4p_{3/2} - 3p4D_{5/2}$ at 690.25nm. The metastable density, $6.0 \times 10^9 cm^{-3}$ on the center of electrodes is measured at conditions that the CCP is sustained at 100MHz with 50W and a pressure of 100mTorr. Consequently we performed a measurement of absolute density of F metastables in the low and middle-density plasma.
[1]Kazuki Takizawa, Koichi Sasaki and Kiyoshi Kadota. Jpn. J. Appl. Phys. Vol40(2001)pp. 5130-5133

Kenji Hayashi
Keio University

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