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Effect of Oxygen on Ar metastables in inductively coupled plasma in O₂/Ar YUICHIRO HAYASHI, CHRISTIAN SCHARWITZ, TOSHIAKI MAKABE, Keio University — Oxygen plasma is widely used in material processing, and oxygen gas diluted by rare gases is employed for many practical reasons. In the present work we experimentally investigate the influence of the rare gas Ar in admixture of Oxygen and Ar by using optical emission and absorption spectroscopy. We have measured the density of Ar metastables (1s₅, 1s₃) in ICP at 13.56 MHz in O₂/Ar at 100 mTorr as functions of mixture ratio of O₂ (0-20 %) and dissipated power (50-150 W) by using laser absorption spectroscopy. The density of Ar metastables has a peak as a function of gas mixture at any power condition, and each of peak values has a similar magnitude of $1.8 \times 10^{11} \text{ cm}^{-3}$. At low percentage of Oxygen the density decreases with increasing the power, while at higher Oxygen content the density increases with increasing the power. The characteristics will imply that the collision and reaction processes for Ar metastable will differ at both of regions in the ICP.

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