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Simultaneous Measurement of Local Densities of Atomic Oxygen and Ozone in Pure Oxygen discharge YUSUKE NAKAGAWA, TAKUYA KAWAKITA, SATOSHI UCHIDA, FUMIYOSHI TOCHIKUBO, Tokyo Metropolitan University — Pure oxygen discharge is preferable for production of atomic oxygen and ozone, while there is the difficulty in measuring their local densities. The ozone density is usually measured by UV absorption, but its resolution is insufficient to measure the local ozone density in filamentary discharges. The atomic oxygen density can be measured by TALIF, but the ozone interference, which is the in-situ atomic oxygen production due to the ozone dissociation by incident UV light, disturbs the measurement. Therefore the compensation of ozone interference is important in atomic oxygen measurement. In this study, we achieved the separation of ozone interference from discharge-originated atomic oxygen, by focusing on the laser intensity dependence of TALIF signals on them. By varying the laser intensity in the TALIF measurement, the atomic oxygen density is separated from the ozone interference signals. Under short-gapped pulsed barrier discharge, the measured atomic oxygen decay rate agreed with the ozone production rate. It means the atomic oxygen decay is dominated by ozone production reaction, not by the recombination of atomic oxygen. This compensation method can be applied to the absolute density calibration of atomic oxygen by ozone density.

Yusuke Nakagawa
Tokyo Metropolitan University

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