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Absolute density measurement of SiH_x radicals in SiH_4/H_2 microwave plasma by modified appearance mass spectrometry TOSHIYUKI KURODA, MASAHIRA IKEDA, TATSUO ISHIJIMA, HIROTAKA TOYODA, Nagoya University — Appearance mass spectrometry (AMS) is one of well-known detection techniques for neutral radicals. In this technique, however, absolute radical densities are generally obtained by simply comparing the signal intensities between stable molecules and neutral radicals, taking the ionization cross sections of stable molecules and neutral radicals into account, resulting in under-estimation of neutral radical densities from the accurate values due to higher surface loss probabilities of neutral radicals. To avoid this problem, this study proposes a modified appearance mass spectrometry that can evaluate radical loss rates inside a differentially-pumped mass spectrometer. Decay time of neutral radicals inside the mass spectrometer is measured using a compact Piezo-chopper that is installed in front of an mass spectrometer orifice. This technique is successfully applied to the measurement of SiH_x radicals in a SiH_4/H_2 microwave plasma.

Tatsuo Ishijima
Nagoya University

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