

Abstract Submitted
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Li⁺ attachment mass spectrometric investigation of high-mass neutral species in the downstream region of Ar/CF₄, Ar/CF₄/O₂ and Ar/CF₄/H₂ plasmas KENJI FURUYA, Kyushu University, HIROSHI OKUMURA, YUJI TAMAI, AKIHIRO IDE, AKIRA HARATA, KYUSHU UNIV. TEAM — Recently gaseous high-mass species have received significant attentions as important contributors to the nucleation of films and particulates in fluorocarbon plasmas. We have unambiguously identified the gaseous high-mass neutral species in the downstream region of the Ar/CF₄ plasma [1], using the Li⁺ attachment ionization technique that is a fragment-free ionization method. In this report, we show the results of mass analysis of high-mass neutral species in the Ar/CF₄/O₂ and Ar/CF₄/H₂ plasmas as well as Ar/CF₄. In the Ar/CF₄ plasma, we observed C_nF_{2n+2} (n = 2-7) and C_nF_{2n} (n = 4-8) as neutral species. Adding O₂ to the Ar/CF₄ plasma resulted in the intensity decrease of C_nF_{2n+2} and C_nF_{2n}, especially of those with relatively small n values. C_nF_{2n}O (n = 1-7) were newly observed in the Ar/CF₄/O₂ plasma. In contrast, adding H₂ to the Ar/CF₄ plasma resulted in the production of various new compounds, such as C_nF_{2n-2} (n=3-8), C_nF_{2n-4} (n=3-9), C_nF_{2n+1}H (n=1-7), C_nF_{2n-1}H (n=2-8), C_nF_{2n-3}H (n=4-9) and C_nF_{2n-5}H (n=5-9). These species are produced through the abstraction of F from various C_nF_m species by the H radical and the addition of H to them. [1] K. Furuya, S. Yukita, H. Okumura, A. Harata, Chem. Lett. **34**, 224 (2005).

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