

P2.3013 Large-scale ferromagnetic enhanced ICP in Ar/Cl₂ mixture

Tuesday, 9 July 2019 14:00 (2 hours)

See full abstract here:

<http://ocs.ciemat.es/EPS2019ABS/pdf/P2.3013.pdf>

Ferromagnetic enhanced inductively coupled plasma sources (FMICP) are considered to be a promising solution to produce large volumes of dense ($\sim 10^{12}$ cm⁻³) uniform plasma for large-area (450 mm) plasma processing systems, due to a high power transfer efficiency, reduced driving frequency (< 0.4 MHz), the absence of capacitive coupling and a low plasma potential [1]. Although the properties of large-scale FMICP sources are well investigated for the case of inert gases [1–4], the impact of halogens addition on the FMICP characteristics is still unknown. To investigate the plasma parameters of a large-scale FMICP in Cl₂/Ar mixture, an experimental setup has been developed. The scheme of the setup is similar to that of [2], except of the ferrite antennas construction (which are optimized for higher voltage operation), gas discharge chamber size and the construction of U-shaped gas discharge tubes (which are adapted for high heat loads). New experimental data have been obtained on the dependence of FMICP electric field strength vs. gas pressure (10–100 mTorr), discharge current (5–20 A) and Cl₂ content. The impact of Cl₂ addition on the electrical characteristics of large-scale FMICP was analyzed and compared with the properties of RF and DC discharges in Ar/Cl₂ mixture.

References

- [1] Godyak V 2013 Journal of Physics D: Applied Physics 46 283001
- [2] Kyeonghyo Lee, Youngkwang Lee, Sungwon Jo et al. 2008 Plasma Sources Sci. Technol. 17 015014 [3] Jin-Young Bang, Jin-Yong Kim and Chin-Wook Chung 2011 Physics of Plasmas 18 073507
- [4] Hyun Jun Kim, Hye-Ju Hwang, Dong Hwan Kim et al. 2015 Journal of Applied Physics 117 153302 The work is supported by the Russian Science Foundation, Grant No. 18–19–00205.

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Presenter: ISUPOV, M. (EPS 2019)

Session Classification: Poster P2

Track Classification: LTPD