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PLASMA DENSITY ENHANCEMENT EFFECTS DURING PLASMA IMMERSION ION IMPLANTATION

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Plasma density enhancement is common during plasma immersion ion implantation (PIII) processes [1]. This effect manifests itself as a significantly increased current density to the target. The enhanced plasma density presents issues for accurate dosimetry in plasma ion implantation processes. Plasma density enhancement can be modelled using an empirically determined density enhancement factor [2] but a first-principles approach would be preferable. This paper discusses the mechanisms leading to plasma density enhancement and their modelling in the context of PIII processes. Consequences of this effects for accurate dosimetry in PIII systems and their various applications including semiconductor processing and fusion materials testing will be discussed.

- 1. B. P. Cluggish and C. P. Munson, "Secondary electron enhanced discharges in plasma source ion implantation", J. Appl. Phys. 84, 1998, pp. 5945-5955.
- S. Qin, M.P. Bradley, P.L. Kellerman, and K. Saadatmand, "Measurements of secondary electron emission and plasma density enhancement for plasma exposed surfaces using an optically isolated Faraday cup", Rev. Sci. Inst. 73, 2002, pp. 1153-1156.

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plasma

Keyword-2

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Keyword-3

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