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Analysis of Sputtering Yield Amplification (SYA) using Optical Emission Spectroscopy (OES), employing materials Cu, Ti, Mo, Ta, C, and Si

Sputtering Yield Amplification (SYA) is a phenomenon involving the modification of collision cascades induced by momentum transfer on a target's surface through the addition of heavy dopant atoms. This process enhances the emission of target atoms, typically lighter than the dopants. In our study, we employed small pieces of three doping materials (Ta, Mo, and Cu) to generate individual film deposits, from which atoms are expelled and returned to the surface of the Si target. Using Optical Emission Spectroscopy (OES), we analyzed the intensity of emission lines from both neutral and ionized species within the sputtering plasma in situ. This data provided real-time insights into the behavior of the SYA phenomenon. Furthermore, we compared these results with an SYA experiment using five small pieces of different doping materials (Cu, Ti, Mo, Ta and C) simultaneously, employing the OES technique.

Keywords

SYA, OES, Mo, Ta, Cu, C, Ti

Reference

J Cruz et al, "Si sputtering yield amplification: a study of the collisions cascade and species in the sputtering plasma", J. Phys. D: Appl. Phys. 54 (2021) 375201, https://doi.org/10.1088/1361-6463/ac0c4e

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