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Selective Influence of Magnetic Field Direction on Plasma Uniformity WENLI COLLISON, VLADIMIR KUDRIAVTSEV, MICHAEL BARNES, Intevac, MARK KUSHNER, University of Michigan — In this study we have investigated computationally hybrid ICP/CCP plasma reactor, with static magnets located under RF electrode. Plasma system is designed for discrete track recording magnetic disk etch applications. Effect of the orientation of magnetic field direction (radial or axial) is studied for Ar plasma using HPEM model [1]. Results show that for both radial and axial magnetic field orientations there is optimal magnet strength which provides maximum uniformity. Axial magnetic field orientation allows simultaneous reversal of both ion flux and plasma density radial distributions (when compared to similar plasma conditions without magnetic field present). Radial magnetic field orientation allows selective reversal of radial distribution of the ion flux, but without affecting radial distribution of plasma density Ne. This can be utilized as an independent knob for selective plasma control. Above described effects are explained by the changes in radial distributions of axial E field and of ion velocity. Finding optimal magnetic strength for both considered field orientations allowed reducing radial uniformity of the ion flux and plasma density across the disk from 7 to 3% (axial) and from 10 to 2.5% (radial). The effects of inclined magnetic field on the ion flux and plasma density have also been investigated.
[1] Y. Yang and M. J. Kushner , J. Vac. Sci. Technol. A **25**, 1420 (2007).

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