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Simulations of magnetically enhanced capacitively coupled plasma discharges using CFD-ACE+ ANANTH BHOJ, MUSTAFA MEGAHED, ESI US R&D Inc, VLADIMIR KUDRIAVTSEV, Intevac — Many plasma processing reactors employ strong magnetic fields to confine or otherwise manipulate the discharge to optimize wafer surface processing [1]. The multi-physics modeling platform CFD-ACE+ was extended to account for the presence of strong magnetic fields on plasma transport in the chamber. The transport coefficients for electrons assume tensor forms whose components are dependent on those of the applied magnetic field. The capacitively coupled plasma (CCP) model either accepts an externally computed magnetic field supplied via user subroutines or uses the solution computed within the magnetic module that addresses the magnetic vector potential equation. In this work, latter approach has been applied to model an Ar discharge in axisymmetric magnetically enhanced CCP reactor configuration. Parametric results over a range of pressures demonstrated the effect of the magnetic field on changing discharge uniformity and plasma density.

[1] http://meetings.aps.org/Meeting/GEC09/Event/107279

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