Plasma Simulation of Gas Flow Effect on Plasma Uniformity in Inductively Coupled Plasma Etcher

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Gas flow injection effect on plasma uniformity in helmholtz inductively coupled plasma (H-ICP) has been studied. CFD-ACE+ commercial code was used for the plasma simulation inside ICP chamber.

Simplified 2 dimensional inductively coupled plasma chamber model has been used in this work. For the simple problem definition, we considered Ar ionization and recombination reaction in plasma state/surface reaction. The flow rate of Ar gas was gradually increased from 145 to 600sccm.

The simulation focused on the effect of different gas injection conditions on plasma density distribution uniformity near the cathode surface, where the 200mm wafer has placed on. Simulated plasma density has compared to the PR blanket wafer ashing (O_2 plasma) process uniformity results with same gas flow rate conditions.