

Abstract Submitted
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Predicting ion flux uniformity at the ion extraction plate in a 3D ICP reactor ABHRA ROY, ANANTH BHOJ, ESI US RD, Inc. — In order to achieve better control in processing the wafer surface, the ion fluxes in a remote plasma system are often focused through one or more ion extraction plates between the main plasma chamber and the downstream wafer plane. The ion extraction plates are typically of showerhead pattern with multiple holes. The focus of this particular study is to predict the ion flux uniformity over the ion extraction plate for a full 3D inductively coupled discharge reactor model using Argon chemistry. We will use the commercial modeling tool, CFD-ACE+, which can address such a process involving gas flow, heat transfer, plasma physics, reaction chemistry and electromagnetics in a coupled fashion. The plasma characteristics in the chamber and uniformity of the ion fluxes at ion extraction plate are discussed. Parametric studies varying the geometrical dimensions and process conditions to determine the effect on ion flux uniformity are presented. The showerhead-like ion extraction plate will be modeled as a porous media with a specified porosity. Further, a spatially varying porosity of the ion extraction plate is used to simulate ion recombination in order to reduce the ion flux non-uniformity. The goal is to optimize the system maximizing the ion flux while maintaining the uniformity.

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