

Abstract Submitted
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Two-Dimensional Particle-in-Cell Simulation of Cylindrical Magnetron Sputters for the Improvement of Target Utilization HUR MIN-YOUNG, BAE HOWN-WON, LEE HO-JUN, LEE HAE-JUN, Pusan National University — Magnetron sputtering has been commonly used for the deposition of a wide range of industrial thin film coating. This method has almost no restrictions in the target materials and the magnetic field enables lower pressures operation. Conventional flat type sputters generate ion-bombardment sputtering in only a localized region of target where electric fields and magnetic fields are perpendicular to each other. Therefore, the utilization efficiency of the target material is about 20~30%. To overcome this drawback, a rotating cylindrical target is devised to make uniform sputtering on the target. In this paper, the difference of the physical effects of ions on the targets between the flat-type and the cylindrical-type sputters is investigated using a two-dimensional particle-in-cell simulation with Monte Carlo collisions. Especially for the calculation of cylindrical field solver with a finite difference method, an image charge method is introduced instead of solving the Poisson equation. Simulation Diagnostics include the plasma density, the distributions of energy and angle of incident ions on the target, and the deposition profiles on the substrate calculated by a ray-trace particle deposition model. The analysis for the rotating speed and the magnet structure is to be discussed.

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