

NUMERICAL SIMULATION OF A MAGNETRON PLASMA SPUTTERING SYSTEM USING VORPAL

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Three-dimensional numerical simulation is conducted for a magnetron sputtering plasma using the particle in cell code VORPAL. Numerical simulation of sputtering process requires accurate models of nuclear stopping in materials, particle dynamics and self-consistent electromagnetic fields. VORPAL can simulate cold dense plasma sputtering system under many different electromagnetic configurations. The dynamics of both incident particles and sputtered neutral atoms are simulated in VORPAL. The sputtering yield is calculated from a standalone numerical library for a variety of materials that are commonly used in industrial applications. Numerical simulation of the spatial distribution of sputtered atoms resulting from a cold dense magnetron sputtering plasma under externally applied magnetic field and self-consistent electric field is presented.