Abstract Submitted
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Sputtering process data interpreted by heavy particle simulations[1] JAN TRIESCHMANN, STEFAN RIES, NIKITA BIBINOV, PETER AWAKOWICZ, Ruhr University Bochum, Germany, STANISLAV MRAZ, JOCHEN M. SCHNEIDER, RWTH Aachen University, Germany, THOMAS MUSSENBROCK, Brandenburg University of Technology Cottbus - Senftenberg, Germany — The initial step toward a reliable prediction of plasma sputter deposition is a benchmark comparison of numerical models with experimental data. In addition to only a reconstruction, however, imperative insight can be gained from the internal state of the applied model. This reasoning is exemplified with an investigation of two sputtering discharges both operated at gas pressures below 1 Pa. Firstly, a large scale multi-frequency capacitively coupled plasma (MFCCP) is considered as characterized experimentally by spatially resolved plasma and deposition diagnostics. Using a kinetic simulation approach, the previously unexplained non-equilibrium transport kinetics is unraveled from calculated spatially resolved sputtered particle distribution functions. Secondly, for a direct current magnetron sputtering (dcMS) discharge experimentally determined sputtered particle density maps and deposition profiles are complemented with numerical simulation results. For different target materials and gas admixtures, the model reconstructs experimental density profiles and, moreover, predicts the inherent deposition efficiency.

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