

Abstract Submitted
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Multi Time-Step Feature Scale Simulations with FPS3D PAUL MOROZ, Tokyo Electron U.S. Holdings, Inc., DANIEL MOROZ, University of Pennsylvania — Most modern materials processing recipes include many time-steps, each one utilizing different chemistry and plasma parameters, resulting in different composition of fluxes coming to the wafer and different energy and angular distributions of incoming species. The FPS3D feature scale simulator [1-2] is capable of handling varied and complex cases due to its structure and numerical techniques. For this presentation, we selected a set of simulations for processes which are dramatically different from each other. One is the Bosch process, which is a high etch-rate (in the range of 1000 Å/s or more) etching for features with dimensions in the range of 1 micron to 100s of microns. The other is the ALE (atomic layer etch), in which etching is done by a single atomic layer per cycle, allowing maximal processing accuracy but with etch rate in the range of one to a few Å/min. Both of these processes involve multiple cycles through the etching and passivation (or deposition) steps. FPS3D is well suited for those tasks as it allows consideration of large fluxes and large dimensions of the Bosch process as well as the delicate ALE processing on an atomic level. Results of both 2D and 3D modeling will be presented and the details of the processes will be discussed.

- [1] P. Moroz, IEEE Trans. on Plasma Science, **39** (11) 2804 (2011).
- [2] P. Moroz, D. J. Moroz, ECS Transactions, **50** (46) 61 (2013).

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