**Plasma-Surface Interactions and Feature Profile Simulations**
PAUL MOROZ, Tokyo Electron US Holdings, Inc., DANIEL MOROZ, University
of Pennsylvania
— Plasma-surface interactions are rather complex in most cases.
One has to take into account not only sticking of gaseous species from plasma to
the surface of solid materials or a set of chemical reactions on the surface producing
solid and gaseous products, but also interactions of atoms within deeper layers of the
material. Etching, deposition, and implantation processes usually go on at the same
time. Energetic particles, such as ions or fast neutrals, could penetrate and etch
materials even in conditions when significant polymer layers are present. Here, we
present a 2D and 3D feature profile simulator FPS3D which is based on the cellular
model and takes into account finite penetration depths of energetic particles. It can
also do simulations for very delicate conditions, such as ALD, when materials are
deposited only by a single atomic layer at a time. Using cells each containing a sin-
gle molecule could introduce significant errors into calculations as sizes of molecules
could differ significantly, and thus we are using a different approach trying to mimic
MD simulations with various approximations and on a larger scale. The code is
applicable to nanometer through micrometer range of features, at least, and it is
fast both for 2D and 3D simulations.

Paul Moroz
Tokyo Electron US Holdings, Inc.