

Joint seminar with NERS



Friday
November 22, 2013
4:00 pm
Room G906
(White Auditorium)
Cooley Building

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Tokyo Electron America

Simulations of Plasma Processes and Equipment for Semiconductor Device Fabrication

For more than four decades, plasma process and equipment development have been complemented by a concerted effort to employ simulation and theory to their design and analysis. Simulation technology has advanced from predictions of the electron energy distribution function and plasma chemistry to multidimensional simulations of plasma equipment. Progress in surface topography evolution models and sub-surface property prediction has been similarly impressive. The result is the wide adoption of simulation science and technology by semiconductor manufacturers and their capital equipment suppliers. Still, deploying modeling and simulation for prototyping, equipment physics analysis, process development, and continuous improvement faces challenges. The pace of introduction of new materials and ever more stringent requirements placed on process by devices are not amongst the least of the reasons. Gaps in understanding of plasma and plasma-surface chemistry are usually at the heart of any barrier. This presentation will illustrate successful applications of integrated (equipment to feature) plasma process modeling and simulation. We will also examine the emerging role of quantum chemistry simulations and molecular dynamics in closing the chemistry gap. Examples of advances in the modeling of microwave and capacitively coupled plasmas will round out the talk.

About the Speaker: Dr. Peter Ventzek is a Member of Technical Staff with Tokyo Electron (TEL) America where he is responsible for plasma process modeling and simulation. He received his BS in Chemical Engr. from the U. of New Brunswick and the MS/PhD. in Nuclear Engr. from the U. of Michigan. His graduate research, with Prof. R. Gilgenbach, dealt with the dynamics of laser ablation plasmas for materials processing. As a post-doctoral researcher at the U. of Illinois he developed a multi-dimensional computer platform for plasma sources for material processing with Prof. M. Kushner. In 1994, Dr. Ventzek joined Hokkaido Univ. Japan as Assoc. Professor in the Dept. of Electrical Engr. His research dealt with plasma process control, laser ablation, neutral beam sources and atmospheric pressure discharges. In 1997, Dr. Ventzek joined Motorola/Freescale as Manager of Austin Simulation Group directing development of integrated computational platforms for plasma etching and deposition. Before joining Lam Research in 2008 as a Technical Director, Dr. Ventzek joined TEL's Technology Development Ctr. (Japan) in 2006. Dr. Ventzek has published over 60 journal articles. His service includes Chair of the AVS Plasma Science and Technology Division, Chair of the GEC and Professor with Keio University's Leading Graduate School Program.