

## SEMICONDUCTOR PROCESS MODELING AND MODEL CALIBRATION USING SILVACO SUPREM

*P. Whiting, V.C. Hwang and K.D. Hirschman, Department of Microelectronic  
Engineering, [pgw5378@rit.edu](mailto:pgw5378@rit.edu), [kdhemc@rit.edu](mailto:kdhemc@rit.edu)*

In modeling semiconductor processes, it is imperative that the process models are calibrated to physically measured results. Different approaches for process model calibration are described, and the strengths and weaknesses are examined. The methodology for calibrating solid state diffusion parameters in order to reduce error between simulated dopant profiles and experimentally verified dopant profiles is outlined. Through the use of interstitial injection variables as well as segregation coefficients, the effect of oxidation enhanced diffusion on a dopant profile may be adjusted to fit process data gathered through sheet resistance measurements as well as spreading resistance profile (SRP) measurements. The effects of interstitial injection and bulk recombination on the junction depths of diffused profiles as well as the effects of dopant segregation on resulting sheet resistances are demonstrated. Lastly, a calibrated model is introduced and a significant decrease in error between simulated dopant profiles and actual dopant profiles is demonstrated.