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Simulation Fidelity in Microlithography

Eytan Barouch, Uwe Hollerbach, Steven A. Orszag
Applied and Computational Mathematics
Princeton University, Princeton, NJ 08544-1000

Martin Pecherar, Milton Rebbert
Microelectronics Division, Naval Research Laboratory
Washington, D.C. 20375-5000

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ABSTRACT

Ground truth comparison between our advanced simulation modules and specific sets of experiments is presented, and simulation fidelity is evaluated. The resists described below are SNR248 negative chemically amplified deep-UV resist, KTI895i positive I-line resist, Shipley ANR negative chemically amplified I-line resist, and SMP1400 positive G-line resist. The simulation is composed of several modules: aerial image calculation, exposure, post-exposure baking (PEB) as reaction-diffusion equations, and dissolution employing reaction diffusion equations as well as Hamilton-Jacobi systems. The experiments described display variations in exposure energies to determine process latitude and cd control, defocus, as well as line shape. Detailed comparisons between experiments and simulations are exhibited for a wide range of photolithographic applications.