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Mesoscale Simulation of the Lithography Process[1] GRANT WILLSON, The University of Texas, GERARD SCHMID, Molecular Imprints, Inc Austin, Texas, JASON MEIRING, The University of Texas — Process simulation is an important tool for the semiconductor industry. Optimization of the microlithography process is extremely expensive since exposure tools that cost in excess of 20 million dollars, which could be dedicated to manufacturing, must be used in the optimization experiments. There exist several commercial simulation packages that work efficiently and accurately all of which are based on parameterized continuum models. Continuing improvements in materials and equipment for microlithography have now provided the ability to print circuit elements with minimum dimensions approaching the size of the molecules that comprise the photoresist. As a result, stochastic and molecular scale effects such as line edge roughness have become an increasing concern and may limit continued progress in this industry. These effects can not be captured by continuum models. Hence, we have worked to develop a mesoscale simulation of the process. The simulator is based upon with discretization of the photoresist film into cells on a three dimensional lattice and a Monte Carlo approach. The entire process has now been simulated in this way. New models for reactive transport, polymer dissolution, etc. have been incorporated in this simulator. Progress will be reported.

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