

# High Chi Block Copolymers for Lithography

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Various incredibly clever tricks based on chemical engineering principles have been devised by that extend the resolution limits of photolithography, some of which are already in use in full scale manufacturing. One promising approach for patterning future generations of devices is based on the directed self-assembly of block co-polymers. We have tried to design block co-polymers that are optimized for this application. Doing so requires blocks with very high interaction parameters ( $\chi$ ) and for some applications, incorporation of silicon into one of the blocks. Aligning these structures and orienting them in a way that is useful for microelectronics has been a challenge. We have worked to develop new high  $\chi$  block copolymers and processes that enable very fast, thermal annealing of these materials and developed new methods for orientation, alignment and pattern transfer with these high resolution patterning materials. A progress report on these efforts will be presented. Polymers of this sort can be dry developed to form very small, high aspect ratio structures