

Block Copolymer Self-assembly as an Extension of Lithography: Status, Applications, Current Research and Future Directions

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Options for continuing dimensional scaling in semiconductor technology grow increasingly complex as feature sizes approach the sub-20 nm regime. The technical challenges associated with the leading candidates for lithographic technology capable of practical application at that scale – EUV lithography, imprint lithography and maskless lithographies – have led to an exploration of alternate routes to form useful patterns at the nanoscale. One of the leading alternate approaches is based on the directed self-assembly (DSA) of block copolymer thin films. Applicable in conjunction with existing lithography technology, this technique has the potential to provide patterns with dimensions as small as ~5 nm with high precision and with accurate placement. In this talk we will provide an overview of block copolymer DSA, describe examples of how it may be incorporated in device fabrication, summarize recent progress in its practical implementation, and describe examples of future opportunities for its use.