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Synthesis and kinetics studies of poly(styrene-b-vinylmethylsiloxane) and its thin film ordering by thermal and solvent annealing SOURAV CHATTERJEE, MD FAKAR UDDIN, BARAKA LWOYA, JULIE N.L. ALBERT, Tulane University — Nano-structured thin film materials are important materials that find uses in templating and membrane applications. Block copolymers (BCP) have gained considerable attention for next-generation lithographic masks due to their self-assemble into morphologies with periodic sub 20 nm feature sizes with high regularity and reproducibility. A novel synthetic block copolymer of poly(styrene-b-vinylmethylsiloxane) (PS-b-PVMS) was synthesized. Like poly(styrene-b-dimethylsiloxane), this polymer has a high Flory Huggins interaction parameter between blocks to minimize feature size. Furthermore, incorporation of the vinyl side group provides an opportunity for post-polymerization chemical modification to manipulate the interaction parameter or impart functionality for various applications. Synthesis and kinetic studies of PS-b-PVMS as well as PS and PVMS homopolymers will be presented. All polymers are well characterized by proton NMR and GPC. As proof of concept, we show that block copolymers having different block fractions self-assemble into the expected nanostructures (lamellae, cylinders, spheres). Thin film studies also will be presented showing how the ordering of PS-b-PVMS is affected by different solvent and thermal annealing conditions.

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