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Complex Structural Packing of ABC Triblock Copolymers Solvent Annealed at High Humidity CHUANBING TANG, University of California Santa Barbara, JOONA BANG, Korea University, GILA STEIN, GLENN FREDRICKSON, CRAIG HAWKER, EDWARD KRAMER, University of California Santa Barbara, MICHAEL SPRUNG, JIN WANG, Argonne National Laboratory — The use of ABC triblock copolymers to obtain industrially relevant morphologies for block copolymer lithography has been investigated. Nanoporous thin films of poly(ethylene oxide)-poly(methyl methacrylate)-polystyrene triblock copolymer spheres were prepared by solvent annealing under controlled high humidity followed by UV degradation and acid washing. Ordered half spheres at the surface that template ordering of spheres below the surface in thin films were formed as a result of the interaction between the highly hydrophilic PEO segments and water vapor in the chamber. The spherical block copolymer domains exhibit complex packing behavior on the surface and in the interior which is dependent on film thickness. Half sphere "monolayer" and half sphere plus whole sphere "bilayer" formed in thin films were shown to have hexagonal lattice symmetry. For half sphere plus two whole sphere "trilayers", coexistence of regions of hexagonal and square packing was observed by TEM, SFM, SEM and GISAXS. Square packing was consistent with a surface truncated unit cell of a body-centered cubic lattice with the (100) plane parallel to the surface.

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