Block copolymers (BCPs) must necessarily have high interaction parameters (χ), a fundamental measure of block incompatibility, to self-assemble into sub–10-nanometer features. Unfortunately, a high χ often results from blocks that have disparate interfacial energies, which makes the formation of useful thin-film domain orientations challenging. To mitigate interfacial forces, polymers composed of maleic anhydride and two other components have been designed as topcoats that can be spin-coated from basic aqueous solution in the ring-opened, acid salt form. When baked, the anhydride reforms and switches polarity to create a neutral layer enabling BCP feature alignment not possible by thermal annealing alone. Top coats were applied to the lamella-forming block copolymers poly(styrene-block-trimethylsilylstyrene-block-styrene) and poly(trimethylsilylstyrene-block-lactide), which were thermally annealed to produce perpendicular features with linewidths of 15 and 9 nm, respectively.

Bates, Christopher M.; Seshimo, Takehiro; Maher, Michael J.; Durand, William J.; Cushen, Julia D.; Dean, Leon M.; Blachut, Gregory; Ellison, Christopher J.; Willson, C. Grant “Polarity-Switching Top Coats Enable Orientation of Sub-10-nm Block Copolymer Domains,” *Science* **338(6108)** 775 (2012).