In the microelectronics industry, sub-10 nm patterning, as dictated by Moore’s law, is a formidable challenge for conventional photolithographic production methods. Thin films of diblock copolymers, or polymers composed of two chemically distinct blocks, have received considerable attention for their potential as sacrificial templates in nanofeature fabrication, imparted by their ability to self-assemble into controlled, ordered, microstructures.\(^1\) In order for these systems to be a viable candidate for device fabrication, the orientation and ordering of thin film domains must be controlled, selectively removable, and ultimately correlate to chip densities aligned with Moore’s law. This talk will focus on recent synthetic efforts to overcome the challenges associated with each of these criteria, as well as the drive to maximize nanodomain density and macroscopic ordering by film processing methods. Recently, successful pattern transfer of ~5 nm domains with long-range lateral ordering has been achieved in pristine block copolymer systems without epitaxial guiding, and truly-macroscopic order has been achieved in epitaxially-aligned systems with as little as ~3 nm feature sizes.\(^2\) The approach described opens a versatile route toward ultrahigh-density microprocessors.

![Pattern transfer process utilizing block copolymer systems](image)

**Figure 1.** Pattern transfer process utilizing block copolymer systems\(^3\)

**References**