Solvent-Vapor-Mitigation of Electrostatics in 3D Cyclopropenium Diblock Copolyelectrolyte Network SEBASTIAN RUSSELL\textsuperscript{1}, SANAT KUMAR\textsuperscript{2}, LUIS CAMPOS\textsuperscript{3}, Columbia University — Photolithography is progressively becoming an obsolete manufacturing technique in the microelectronic industry as block copolymer (BCP) nanoassembles approach sub 10-nm features sizes. Thermodynamically, the morphology and limiting feature size, for BCP, are determined by the relative volume fraction and magnitude of the incompatibility ($\chi N$) between each block. Therefore, to achieve smaller dimensions, it is imperative to devise copolymer systems that are strongly segregating ($\chi N >> 10$) by utilizing high monomer incompatibility, large $\chi$. For synthetic cylinder forming BCPs, achieving sub-10 nm features with a high degree of lateral ordering still remains a challenge. Covalently bound ions could potentially be a route towards enhancing the segmental incompatibility and this presentation will focus on the self-assembly of post-polymerization functionalized cyclopropenium-ion diblock copolyelectrolytes (DBCPE) through solvent vapor annealing. By varying the BCPE’s total degree of polymerization and charge fraction we have mapped the kinetic phase-space. This control over morphology has opened the door to sub-10nm features with tunable densities by varying the length of the neutral and polyelectrolyte block, respectively.

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