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**pH-Responsive Nanostructures Assembled from Amphiphilic Block Copolymers** CHEN XU, BRADFORD WAYLAND, MICHAEL FRYD, KAREN WINEY, RUSSELL COMPOSTO, University of Pennsylvania — We present a novel route to assemble thin films containing pH-responsive nanostructures of hydrophilic cylindrical domains oriented perpendicular to a silicon substrate. The amphiphilic block copolymer, poly(styrene-*b*-acrylic acid) (PS-*b*-PAA) is prepared from the precursor, poly(styrene-*b*-*tert*-butyl acrylate) (PS-*b*-PtBA), by an auto-catalytic reaction involving surface hydroxyl groups. The surface morphology and evolution of the nanostructures in aqueous solutions over a pH range of 2.6 to 9.1 are captured by in situ atomic force microscopy (AFM). The ordered PS-*b*-PAA films exhibit unique surface morphologies across three pH regimes. The equilibrium film thickness increases as pH increases, and is reversibly recovered upon decreasing pH. The water contact angle decreases by 30° as pH increases from 2.6 to 9.1, demonstrating that wettability can be tuned by varying the pH of the surrounding medium. Because of their pH-responsive behavior and small feature size, nanostructured devices designed from amphiphilic block copolymers have potential applications including sensors and membranes.

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