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Fabrication of Patterned Mesoporous Silica Films Templated From Chemically Amplified Block Copolymers SIVAKUMAR NAGARAJAN, University of Massachusetts, Amherst, JOAN BOSWORTH, CHRISTOPHER OBER, Cornell University, JAMES WATKINS, THOMAS RUSSELL, University of Massachusetts, Amherst — Mesoporous metal oxide films have been the subject of intense research, for numerous applications including sensors, microfluidics, microelectronics, optoelectronics, microelectromechanical systems and catalysis. Many applications require precise patterning of the films to incorporate device features necessary for intended application. Here, patterned mesoporous silica films are obtained by performing domain selective condensation of precursors within self-assembled block copolymer templates by using supercritical CO_2 as a delivery medium. The domain selectivity is imparted by the segregation of acid catalyst into hydrophilic domains. Further, by using a photo acid generator, the presence of acid within the film can be controlled spatially via photolithography. Thus patterns at two different length scales i.e., at nanoscale from self-assembled block copolymer and microscale from photolithography can be generated simultaneously. Chemically amplifiable polymers, including poly (tertiary-butoxy carbonyloxy styrene-b-styrene), were used as block copolymer templates. Triphenyl sulfonium triflate was used as a photo acid generator.

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