

Abstract Submitted  
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**Patterned mesoporous media via 3-D replication in supercritical Carbon dioxide.** SIVAKUMAR NAGARAJAN, THOMAS RUSSELL, JAMES WATKINS, University of Massachusetts, Amherst, JOAN BOSWORTH, PETER BUSCH, DETLEF SMILGIES, CHRISTOPHER OBER, Cornell University — Mesoporous metal oxide films having cylindrical channels oriented normal to the surface have generated intense interest due to their potential use as sensors, catalysts and detection devices. Further, the ability to pattern these mesostructured films makes it versatile to generate mesoporous materials with precisely controlled geometries and morphologies. Here we describe a novel route to mesoporous silica films with perpendicular nanochannels prepared by the 3-D replication of block copolymer templates in supercritical carbon dioxide. Templates comprised of poly( $\alpha$ -methyl styrene) cylinders oriented normal in the matrix of poly (hydroxy styrene) having trace amounts of acid catalyst was infused with solutions of silica precursor in sc CO<sub>2</sub> to selectively deposit silica within the matrix. Calcination yielded the porous silica arrays. The phase selective deposition was enabled by segregation of acid catalyst into hydrophilic matrix. Substitution of acid catalyst with photo sensitive acid generators facilitates to pattern the mesoporous films, which could potentially have applications in microfluidic devices and low-dielectric constant layers for microelectronic devices.

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