Oriented Mesoporous Inorganic Thin Films Using Laterally Confined Swellable Block Copolymer Templates. SE GYU JANG, UCSB, EDWARD J. KRAMER, UCSB, SEUNG-MAN YANG, KAIST, KAIST (SNL) COLLABORATION, UCSB (KRAMER) COLLABORATION — The control of grain orientation and long-range ordering of mesoporous inorganic materials produced by a sol-gel reaction of an inorganic precursor in self-assembling amphiphilic template systems have been limited due to the restrictions both on the time-scale and conditions for processing imposed by network formation of the inorganic component. Our goal is to form ordered mesoporous inorganic thin films by starting with a crosslinkable block copolymer template with long range order. A cylindrical poly(styrene-2-vinylpyridine) (PS-P2VP) diblock copolymer with Mn = 32.7 kg/mol and f_{PS} = 0.21 was spin-cast onto a set of 30 nm high and 2000 nm wide SiOx channels on Si substrates produced by optical lithography. An ordered PS-P2VP monolayer\(^1\) is achieved via slow cooling after heating above its bulk order-disorder transition temperature (212 C), measured by small angle X-ray scattering. Hybrid inorganic/organic structures are fabricated by incorporation of inorganic precursor into the chemical cross-linked P2VP matrix.\(^2\) Cylindrical pores within the inorganic matrix are then obtained by removal of the organic component using UV-ozone treatment.\(^1\)M.R.Hammond, E. Cochran, G.H. Fredrickson, E.J. Kramer Macromolecules 38 6575 (2005). \(^2\)R.C. Hayward, B.F. Chmelka, E.J. Kramer Macromolecules 38 7768 (2005).