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Thermally Switchable Aligned Nanopores by Magnetic-Field Directed Self-Assembly of Block Copolymers[1] CHINEDUM OSUJI, Yale University — Magnetic fields provide a facile approach to direct the self-assembly of magnetically anisotropic block copolymer nanostructures in a scalable manner. Here we combine such field-based processing with materials design to enable the fabrication of polymer films with highly aligned stimuli-responsive nanopores. Etch removal of a poly(D,L-lactide) (PLA) brush that is the minority component of a liquid crystalline block copolymer is used to produce nanopores of ~ 8 nm diameter. The pores can be reversibly closed and opened while retaining their alignment by appropriate heating and cooling. We present TEM and temperture resolved scattering data during pore closure and re-opening to explore the mechanism and kinetics of pore collapse.

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