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Curvature-directed crystallization of isotactic poly(propylene) in nanopores[1] DARIYA REID, BRIDGET EHLINGER, JODIE LUTKENHAUS, Texas A&M University — Properties of a cylindrically confined polymer may greatly differ from its properties in bulk state when the geometrical restrictions approach the size of the polymer itself. Confinement of polymer dielectrics, such as isotactic polypropylene (iPP), in nanoporous templates can potentially enhance the dielectric properties of the material via directed crystallization. iPP was melt-wetted into nanoporous templates of varying diameter (15 - 200 nm) in order to study the effect of pore dimensions on crystallization. Using differential scanning calorimetry (DSC) and X-ray diffraction (XRD), it is shown that iPP crystallizes into the α-phase and preferentially orients along the long axis pore. A transition from hetero to homogeneous crystallization was observed in relation to pore diameter. The isothermal crystallization kinetics was analyzed using Avrami analysis. As the pore diameter decreases crystallization shifts to a multi-mode process, whose origins will be discussed in this presentation.

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