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Curvature-directed crystallization of polymer dielectrics in nanopores DARIYA REID, BRIDGET EHLINGER, Texas A&M University, LIN SHAO, Yale University, JODIE LUTKENHAUS, Texas A&M University — When a polymer is constricted in geometries smaller than its unperturbed molecular size its properties may greatly differ from the bulk state. The effect of cylindrical confinement on crystallization of isotactic polypropylene (iPP) and polycarbonate (PC) was studied. Polymer nanowires were prepared by melt-wetting into nanoporous templates of varying diameter (15 – 200 nm). X-ray diffraction (XRD) studies reveal that iPP crystallizes into the α-phase and preferentially orients along the long axis of the pore. Using differential scanning calorimetry (DSC) it is shown that iPP transitions from hetero to homogeneous nucleation as the pore diameter decreases. The isothermal crystallization kinetics is analyzed using Avrami analysis and a progression, with time, into primarily 1D crystallization is presented.

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