

Abstract Submitted  
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**Homogeneous nucleation of polymers under confinement and its relation to the liquid-to-glass “transition”** YASUHITO SUZUKI, Max-Planck Institute for Polymer Research, HATICE DURAN, TOBB University of Economics and Technology, MARTIN STEINHART, Universität Osnabrück, HANS-JÜRGEN BUTT, Max-Planck Institute for Polymer Research, GEORGE FLOUDAS, University of Ioannina — The crystallization and local dynamics of model semi-crystalline polymers confined to self-ordered nanoporous alumina (AAO) were studied as a function of pore size, molecular weight and cooling/heating rate by differential scanning calorimetry, wide-angle X-ray diffraction and dielectric spectroscopy. In contrast to the bulk, polymers located inside nanoporous alumina crystallize via distinct nucleation mechanisms. Under confinement, the usual heterogeneous nucleation of bulk polymers is suppressed. Instead, within the smaller pores polymer crystallization is initiated via homogeneous nucleation. We provide the phase diagram of crystallizable polymers under confinement. We find that homogeneous nucleation is strongly coupled to the local viscosity and hence to the liquid-to-glass “transition.” Dielectric spectroscopy revealed that confinement affects both the distribution of relaxation times (much broader under confinement) and the rate of segmental motion (faster dynamics under confinement).

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