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Effect of chain topology on crystallization within nanoporous alumina. YANG YAO, YASUHITO SUZUKI, Max Planck Institute for Polymer Research, TAKAMASA SAKAI, The University of Tokyo, JAN SEIWERT, HOLGER FREY, Johannes Gutenberg University of Mainz, MARTIN STEINHART, Osnabrueck University, HANS-JUERGEN BUTT, Max Planck Institute for Polymer Research, GEORGE FLOUDAS, University of Ioannina — Polymer topology has inevitable influence on the structure, packing, and dynamic of chains. Herein, we investigate for the first time the impact of polymer architecture on crystallization under 2D confinement, the latter provided by nanoporous alumina (AAO). We employ two poly(ethylene oxide) (PEO) star polymers to study the effect of (i) end groups and (ii) molecular weight on polymer crystallization in the bulk and under confinement. Bulk end groups reduce the crystallization/melting temperatures and the corresponding equilibrium melting point. Under confinement, in the absence of catalyst, homogeneous nucleation prevails as with linear PEOs. The homogeneous nucleation temperatures for the star polymers agree with that of linear ones provided that the arm molecular weight is used instead. Long-range dynamics pertinent to star relaxation are affecting the homogeneous nucleation temperature. On the other hand, the segmental dynamics speed up on confinement. In addition to star PEO, we study the effect of another topology, i.e. hyperbranched PEO, on the nucleation mechanism.

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