Abstract Submitted
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Chain configurations, glass transition and polymer dynamics in polymer nanoparticles under 3D-confinement[1] AURORA NOGALES, DANIEL E. MARTINEZ-TONG, MICHELINA SOCCIO, ALEJANDRO SANZ, TIBERIO A. EZQUERRA, Instituto de Estructura de la Materia, CSIC — Polymer nanospheres with different size distributions of several polymer systems are prepared by a variety of methods, including miniemulsion and flash precipitation among others. The physical properties of the obtained nanoparticles have been studied. The calorimetric trace of these spheres shows an increase of the glass transition temperature that has been evaluated by means of an entropy model. This 3D-confinement, imposed by the nanospheres, leads to a limiting number of repeating polymer units in the sphere and thus to a reduction of the possible configuration states of the polymer chains, which is ultimately related to variations in the bulk value of the glass transition temperature. Our model is evaluated against our calorimetric measurements as well as with the data available in the literature. Good agreement between data and model is found for many cases, proving that confinement is related to reductions in entropy for these systems.

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