Crystallization in polymer nanocomposites KYRIAKH CHRIS-SOPOULOU, HELENA PERIVOLARI, STEFANOS LEISCH, HELEN PAPANANOU, SPIROS H. ANASTASIADIS, FORTH-IESL and Univ. of Crete — Polymer crystallization is a very interesting topic since it is responsible for the final properties of the materials. On the other hand, addition of inorganic nanomaterials has been recently widely used to optimize polymer properties. In this work, the effect of the presence of surfaces and of the severe confinement on polymer morphology and crystallization are investigated in hydrophilic nanohybrids of poly(ethylene oxide) and silica nanoparticles of different sizes; hybrids with different ratios of the two kinds of nanoparticles were synthesized as well, to achieve the highest confinement. Differential Scanning Calorimetry (DSC) and X-Ray Diffraction (XRD) were utilized to investigate the behavior and showed that the polymer chains that were able to crystallize showed a different crystalline behavior in the hybrids with lower Tm and lower crystallinity. Under severe confinement polymer crystallization was completely suppressed. Moreover, the crystallization kinetics was investigated with Isothermal Polarized Optical Microscopy (POM) and Isothermal Differential Scanning Calorimetry (DSC) showing different characteristics in the hybrids compared to that of the neat polymer depending on the silica content. Sponsored by the Greek GSRT (AENAO research project, Action KRIPI)

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