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Effects of severe confinement on the structure and dynamics in polymer nanocomposites S.H. ANASTASIADIS[1], K. CHRISSOPOULOU, S. FOTIADOU, Foundation for Research and Technology - Hellas, K. ANDRIKOPOULOS, G.A. KOUROUKLIS, Aristotle Univ. of Thessaloniki, Greece, B. FRICK, ILL, Grenoble, France — The structure and dynamics of PEO/Na^+MMT nanocomposites is investigated by XRD, DSC, Raman spectroscopy, and quasi-elastic neutron scattering (QENS). For concentrations up to 20 wt% PEO, the PEO chains within the galleries form either a single- or a double-layer structure of intercalated chains; at higher PEO content only double-layers of intercalated PEO chains are formed within the 0.9nm galleries. For PEO content below 70 wt%, the absence of XRD peaks that can be assigned to crystalline PEO and of any DSC melting transition as well as the observation of broad Raman lines reveal that the PEO chains remain liquid-like. It is only for PEO content higher than 70 wt% that diffraction peaks characteristic of bulk PEO are observed together with sharp Raman lines, proving crystallization of only the excess polymer outside the completely full galleries. QENS investigated the dynamics of PEO in bulk and in confinement. A jump of the bulk PEO dynamics at T_m is observed whereas the dynamics of confined PEO shows only weak temperature dependence and goes smoothly through the bulk T_m. Sponsored by NATO's Scientific Affairs Division, by the Greek GSRT and by the EU.

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