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Effect of confinement on the polymer segmental motion and on ion mobility in PEO/layered-silicate nanocomposites[1] SPIROS H. ANASTASIADIS[2], KIRIAKI CHRISSOPOULOU, ATHANASIOS AFRATIS, Foundation for Research and Technology - Hellas, Heraklion Crete, Greece, M.M. ELMAHDY, GEORGE FLOUDAS, University of Ioannina, Ioannina, Greece, BERNHARD FRICK, Institut Laue-Langevin, Grenoble, France — The effect of confinement on the local, the segmental and the ionic processes of poly(ethylene oxide)/montmorillonite (PEO/MMT) intercalates are investigated. X-ray diffraction, DSC and polarizing optical microscopy data show that the intercalated PEO chains remain amorphous and it is only the excess PEO chains outside the galleries that crystallize. This is also verified by the behavior of the elastic intensity of quasi-elastic neutron scattering (QENS) experiments on the same hybrids. Dielectric relaxation spectroscopy reveals that confinement results in an acceleration of the PEO segmental dynamics that display an Arrhenius temperature dependence with very low activation energy, whereas the local beta-process remains unaffected. Likewise, ionic mobility is enhanced in the nanohybrids suggesting that ion mobility is assisted by the faster PEO segmental motion.

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