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Structure and Dynamics in Hyperbranched Nanohybrids K. CHRISSOPOULOU, S. FOTIADOU, S.H. ANASTASIADIS, Foundation for Research and Technology-Hellas and Univ. of Crete, Greece, B. FRICK, ILL, France — The structure and dynamics of a hyperbranched polyester-amide (Hybrane® 1200, Mn=1200, Tg=45°C) polymer and its nanocomposites with natural montmorillonite (Na^+-MMT) are investigated to offer a detailed picture of its behavior in bulk and under confinement and reveal its potential use for various applications. The static properties were studied utilizing X-ray diffraction (XRD), while the dynamics using energy-resolved elastic and quasi-elastic neutron scattering (QENS). XRD reveals that the polymer chains reside within the galleries of the Na^+-MMT producing an intercalated nanocomposite. The elastically scattered intensity for the polymer exhibits two distinct relaxation steps, which are attributed to the methyl group rotation and to the segmental motion. The intensity for the nanocomposite shows the first step broader than the respective of the pure polymer indicating restricted local motion whereas it indicates frozen dynamics under confinement at temperatures higher than the bulk polymer glass transition temperature, Tg. The QENS spectra measured at temperatures covering the regimes below and above Tg are in agreement with the elastic measurements. Sponsored by the Greek GSRT ($\Sigma YNEP\Gamma A\Sigma IA$; $09\Sigma YN-42-580$) and by the EU (CP-IP 246095-2).

Kyriakh Chrissopoulou
Foundation for Research and Technology-Hellas

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