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Dynamics of Hyperbranched Polymers under Confinement¹ KRYSTALLENIA ANDROULAKI, KIRIAKI CHRISSOPOULOU, SPIROS H. ANASTASIADIS, Foundation for Research and Technology-Hellas and Univ. of Crete, Greece, DANIELE PREVOSTO, MASSIMILIANO LABARDI, University of Pisa, Italy — The effect of severe confinement on the dynamics of three different generations of hyperbranched polyesters (Boltorns) is investigated by Dielectric Spectroscopy. The polymers are intercalated within the galleries of natural Na⁺-MMT, thus, forming 1nm polymer films confined between solid walls. The T_g 's of the polymers determined by DSC show a clear dependence on the generation whereas the transition is completely suppressed when all the polymer chains are intercalated. The dynamic investigation of the bulk polymers reveals two sub- T_q processes, with similar behavior for the three polymers with the segmental relaxation observed above the T_q of each. For the nanocomposites, where all polymers are severely confined, the dynamics show significant differences compared to that of the bulk polymers. The sub- T_q processes are similar for the three generations but significantly faster and with weaker temperature dependence than those in the bulk. The segmental process appears at temperatures below the bulk polymer T_q , it exhibits an Arrhenius temperature dependence and shows differences for the three generations. A slow process that appears at higher temperatures is due to interfacial polarization.

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> Spiros H. Anastasiadis Foundation for Research and Technology-Hellas and Univ. of Crete, Greece

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