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**The Aging Effect on Segmental Dynamics of PMMA brushes Studied by Incoherent Neutron Scattering** PINAR AKCORA, Columbia University, VICTORIA GARCIA-SAKAI, NIST Center for Neutron Research, LINDA SCHADLER, Rensselaer Polytechnic Institute, SANAT KUMAR, Columbia University, COLUMBIA UNIVERSITY TEAM, NCNR CENTER FOR NEUTRON RESEARCH COLLABORATION — We have performed quasi-elastic neutron scattering experiments on nanocomposites comprised of a PMMA homopolymer mixed with silica particles on which a PMMA brush is attached. The PMMA brushes were 55k in molecular weight with a grafting density of 0.3 chains/nm$^2$, while we considered two matrices, 20k and 200k PMMA homopolymers, respectively. (The particle weight fraction was varied in the range 0-0.25 in a series of samples.) In all cases there are very strong aging effects, emphasizing the long equilibration times that these hybrid materials require. After a week of equilibration at 150°C, we have found that in the case of wet brushes (i.e., the 20k matrix) the mean-square displacement only changes weakly with decreasing particle concentration. In contrast, the MSD decreased strongly with increasing particle concentration in the case of non-wetting matrices. These results stress that confinement effects (which increase with increasing particle content) play a secondary role to the effect of wetting behavior in determining the thermomechanical properties of these nanocomposites.

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