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The physical aging of star-shaped macromolecules: role of functionality PETER GREEN, BRADLEY FRIEBERG, EMMANOUIL GLYNOS, University of Michigan, GEORGIOS SAKELLARIOU, University of Athens — The phenomenon of physical aging, structural relaxations that enable the return of a polymer, quenched to a temperature T_{age} below its glass transition temperature T_g, to equilibrium, was investigated in a series of star-shaped macromolecules. These macromolecules possessed functionalities that varied from $f = 3$ to $f = 64$, and their degrees of polymerization per arm N were all comparable ($N \sim 100$). The aging of these star-shaped macromolecules is qualitatively similar to that of linear chain polymers, with their aging rates K exhibiting maxima at threshold temperatures T_{tr}. The aging rates of the star-shaped molecules, however, are slower than their linear analogs. Moreover, T_{tr} decreased with increasing f, and K increased with increasing f for $T_{age} < T_{tr}$. Our results are, in part, rationalized in terms of dynamic percolation models.

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