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Nanoparticle Organic Hybrid Suspensions: Structure and Rheology SAMANVAYA SRIVASTAVA, LYNDEN ARCHER, Cornell University — Nanoparticle Organic Hybrid Materials (NOHMs) are a new class of tethered nanoparticle systems with high grafting densities and behave as model systems for studying spherical polymer brushes. Here we report rheology and scattering measurements of NOHMs with a silica core and PEG corona suspended in PEG oligomers at varying volume fractions. Our rheology results reveal a liquid-glassy transition at strikingly low core volume fractions in these suspensions and prominent stress overshoots in flow startups indicative of yielding in the high volume fraction suspensions. Further, we elucidate the form of particle interactions in the glassy suspensions and compare them with established models. Also, a negative first normal stress difference in the moderate volume fraction suspensions is reported, which is in agreement with recent theoretical and experimental findings. We also report small angle scattering measurements of these suspensions to reveal their equilibrium structure, which are in qualitative agreement with a recent theoretical study (Langmuir, 2010, 26, 16801).

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