Abstract Submitted
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Physical Gelation of a Nano-Composite Soft Glass[1] H. HENNING WINTER, National Science Foundation and University of Massachusetts Amherst, KATIE T. LANIA, FEI LI, University of Massachusetts Amherst, XIAOLIANG WANG, Nanjing University, China — Materials in Nature often gain their functionality from being composite on the smallest scale. This is mimicked in manmade nano-composites which profit from the large specific surface area of thin solid enclosures (examples: clay leafs or graphene). Here we use rheology to examine the slow ripening of an out-of-equilibrium model system ("soft glass") that consists of clay particles that swell, break up, and eventually exfoliate into randomly oriented clay leafs through the action of end-functionalized ("sticky") polymer molecules. The nano-composite serves as model soft glass in search of regular patterns in the non-equilibrium dynamics in the approach of equilibrium. Experiments on the model system suggest a scaling relation for the time-resolved viscoelasticity of physical gelation (Macromolecules 43:1901, 2010). Experiments on a wider group of soft glasses is in progress with the objective of confirming or rejecting universality of the novel findings. The experimental protocol includes time-resolved rheometry (Rheol Acta 33:385-397, 1994) and rescaling of data.

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