

Abstract Submitted  
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**Gelation and state diagram for a model nanoparticle system with adhesive hard sphere interactions** NORMAN WAGNER, University of Delaware, EBERLE AARON, NIST — We provide the first comprehensive state diagram of thermoreversible gelation in a model nanoparticle system from dilute concentrations to the attractive driven glass. We show the temperature dependence of the interparticle potential is related to a surface molecular phase transition of the brush layer using neutron reflectivity (NR) and small-angle neutron scattering (SANS) [1]. We establish the temperature dependence of the interparticle potential using SANS, dynamic light scattering (DLS), and rheology. The potential parameters extracted from SANS suggest that, for this system, gelation is an extension of the Mode Coupling Theory (MCT) attractive driven glass line (ADG) to lower volume fractions and follows the percolation transition. Below the critical concentration, gelation proceeds without competition for phase separation [2]. These results are used to develop a complete state diagram for the sticky hard sphere reference system.

[1] A.P.R. Eberle, N.J. Wagner, B. Akgun, S.K. Satija, *Langmuir* **26** 3003 (2010).

[2] A.P.R. Eberle, N.J. Wagner, R. Castaneda-Priego, *Phys. Rev. Lett.* **105704** (2011).

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