Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Reversible and Tunable Network Formation of Ca^{2+}-Sensitive Biomaterials SHANA TOPP, VIKRAM PRASAD, GIANGUIDO C. CIANCI, ERIC R. WEEKS, JUSTIN P. GALLIVAN, Emory University — A major goal of polymer science is to develop "smart" materials that sense chemical signals in complex environments and respond with predictable changes in their mechanical properties. We present a genetic toolbox of natural and engineered protein modules that can be rationally combined in manifold ways to create reversible self-assembling materials that vary in their composition, architecture, and mechanical properties. The protein calmodulin, which binds Ca^{2+} with micromolar affinity but does not bind Mg^{2+}, was employed to develop materials that could discriminate between the two cations. Using calmodulin and other modules in the toolbox, we produced several materials that reversibly self-assemble in the presence of Ca^{2+} and characterized these materials using particle-tracking microrheology. Since the properties of these materials could be predicted from the dilute solution behavior of their component modules, an expanded toolbox may be generally useful for creating new stimuli-sensitive materials.

Shana Topp
Emory University

Date submitted: 20 Nov 2006 Electronic form version 1.4