Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Silk Electrogel Rheology[1] A.P. TABATABAI, J.S. URBACH, D.L. BLAIR, Department of Physics, Georgetown University, D.L. KAPLAN, Department of Biomedical Engineering, Tufts University — We present experimental results on the rheology on electrogels derived from aqueous solutions of reconstituted *Bombyx Mori* silk fibroin protein. Through electrochemistry, the silk protein solution develops local pH changes resulting in the assembly of protein into a weak gel. We determine the physical properties of the electrogels by performing rheology and observe that they exhibit the characteristics of a crosslinked biopolymer network. Interestingly, we find that these silk gels exhibit linear elasticity over a range of up to two orders of magnitude larger than most crosslinked biopolymer networks. Moreover, the nonlinear rheology exhibits a strain-stiffening behavior that is fundamentally different than the strain-stiffening observed in crosslinked biopolymers. Through rheological techniques we aim to understand this distinctive material that cannot be explained by current polymeric models.

[1]This work is supported by a grant from the AFOSR FA9550-07-1-0130.

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Date submitted: 14 Nov 2013 Electronic form version 1.4