Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Peptide – Silica Hybrid Networks AYSEGUL ALTUNBAS, NIKHIL SHARMA, RADHIKA NAGARKAR, UDEL, JOEL SCHNEIDER, DARRIN POCHAN, UDEL, SCHNEIDER COLLABORATION — In this study, a bio-inspired route was used to fabricate scaffolds that display hierarchical organization of an inorganic layer around an organic self-assembled peptide fibril template. The 20 amino acid peptide used in this study intramolecular folds into a beta-hairpin conformation on addition of a desired solution stimulus. This intramolecular folding is followed by intermolecular self-assembly of the peptides into a three dimensional network of entangled fibrils rich in beta-sheet with a high density of lysine groups exposed on the fibril-surfaces. The lysine-rich surface chemistry was utilized to create a silica shell around the fibrils. The mineralization process of the fibrils results in a rigid, porous silica network that retains the microscale and nanoscale structure of the peptide fibril network. Structural characterization via Transmission Electron Microscopy, cryogenic-Scanning Electron Microscopy, mechanical characterization via oscillatory rheology, Small Angle X-ray and Neutron Scattering of the silicified hydrogels will be presented.

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Date submitted: 03 Dec 2009 Electronic form version 1.4