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Structural Properties of Silk Electro-Gels[1] A.P. TABATABAI, J.S. URBACH, D.L. BLAIR, Department of Physics, Georgetown University, D.L. KAPLAN, Department of Biomedical Engineering, Tufts University — The interest in *Bombyx Mori* silk emerges from its biocompatibility and its structural superiority to synthetic polymers. Our particular interest lies in understanding the capabilities of silk electro-gels because of their reversibility and tunable adhesion. We create an electro-gel by applying a DC electric potential across a reconstituted silk fibroin solution derived directly from *Bombyx Mori* cocoons. This process leads to the intermolecular self-assembly of fibroin proteins into a weak gel. In this talk we will present our results on the effects of applied shear on electro-gels. We quantify the structural properties while dynamically imaging shear induced fiber formation; known as fibrillogenesis. It is observed that the mechanical properties and microstructure of these materials are highly dependent on shear history. We will also discuss the role of surface modification, through micro-patterning, on the observed gel structure. Our results provide an understanding of both the viscoelastiticity and microstucture of reconstituted silks that are being utilized as tissue scaffolds.

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