Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Stretching silk-elastin-like peptide polymers induces nucleation of amyloid nanofibers: Mechanistic study using time-lapse lateral force microscopy[1] NITINUN VARONGCHAYAKUL, Department of Materials Science and Engineering, University of Maryland, College Park, MD, USA, TRINA QUABILI, SARA JOHNSON, Fischell Department of Bioengineering, University of Maryland, College Park, MD, USA, JOONIL SEOG, Department of Materials Science and Engineering, University of Maryland, College Park, MD, USA — We studied the nucleation mechanism of silk-elastin-like peptide (SELP) nanofibers using lateral force microscopy. When a single line was repeatedly scanned on SELP coated mica surface, a sudden height increase was observed, indicating that the nucleus of amyloid fiber was formed during lateral scanning. The detailed analysis of frictional force profiles revealed that increase of frictional force was followed by a nucleus formation. The profile of increased frictional force was well fitted with exponential function, suggesting that AFM tip stretches multiple SELP molecules to the scanning direction. The probability of nucleus formation was highly dependent on the maximum level of increased frictional force, implying that the highly stretched SELPs are more likely to form nucleus for nanofiber growth.

[1]The authors gratefully acknowledge the support of NSF Ca-reer Award #1056552.

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Date submitted: 20 Nov 2012 Electronic form version 1.4