Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Hydroxyapatite growth induced by self-assembled noncollageneous extracellular protein: a study on biomineralization *in vitro* XIAOLAN BA, YIZHI MENG, NADINE PERNODET, SUE WIRICK, CHRIS JACOBSEN, Stony Brook University, HELGA FÜREDI-MILHOFER, The Hebrew University, YI-XIAN QIN, MIRIAM RAFAILOVICH, Stony Brook University, ELAINE DIMASI, Brookhaven National Laboratory — Little is known about the role of various ECM proteins in the formation of calcium phosphate during the biomineralization. Here we follow the calcium phosphate mineralization process in vitro using two different ECM proteins, fibronectin and elastin. The mechanical properties of the protein fibers during the early stages were probed by shear modulation force microscopy. The development of the mineral crystals along the protein matrices was investigated by scanning electron microscopy, soft x-ray scanning transmission microspectroscopy, and grazing-incidence synchrotron x-ray diffraction. The elastic modulus of the fibers in the elastin-fibronectin mixture increased to a greater extent than that of the fibers from a single protein. In the presence of fibronectin, longer exposure in the mineral solutions led to the formation of hydroxyapatite crystals templated along the self-assembled fiber structures, while elastin fibers collected calcium without crystallizing. Ca L-edge XANES spectra confirm that Ca in the Ca-elastin complex lacks the mineral anion coordination found in the fibronectin systems and in Ca mineral controls.

Xiaolan Ba
Stony Brook University

Date submitted: 09 Dec 2008 Electronic form version 1.4