

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Determining Beta Sheet Crystallinity in Fibrous Proteins by Thermal Analysis and Infrared Spectroscopy¹ XIAO HU, DAVID KAPLAN, PEGGY CEBE, Tufts University — We report a study of self-assembled beta pleated sheets in *Bombyx mori* silk fibroin films using thermal analysis and infrared spectroscopy. Crystallization of beta pleated sheets was effected either by heating the films above the glass transition temperature (Tg) and holding isothermally, or by exposure to methanol. The fractions of secondary structural components including random coils, alpha helices, beta pleated sheets, turns, and side chains, were evaluated using Fourier self-deconvolution (FSD) of the infrared absorbance spectra. As crystalline beta sheets form, the heat capacity increment from the TMDSC trace at Tg is systematically decreased and is linearly well correlated with beta sheet content determined from FSD. This analysis of beta sheet content can serve as an alternative to X-ray methods and may have wide applicability to other crystalline beta sheet forming proteins.

¹The authors thank the National Science Foundation Division of Materials Research, Polymers Program, for support of this research through grant DMR-0402849.

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Date submitted: 17 Nov 2006

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