

PEGGY CEBE

*Department of Physics and Astronomy
Tufts University
Science and Technology Center, Room 208
4 Colby Street
Medford, MA 02155
617-627-3365
peggy.cebe@tufts.edu*

Memo

To: Prof. Robert Cook, Chair of Tufts University FRAC

Da: February 15, 2006

Re: Report on Completion of Prior FRAC Award

In 2005, we finally completed the project titled "Dielectric Studies of Model Peptides" which was awarded in 2001. The purpose of the FRAC request in 2001 was to open a new area of research for my group, in biological materials. The goals of the program were to establish the capability for performing dielectric relaxation measurements here at Tufts, and to investigate the properties of biological materials. A change of personnel was the main reason for the long time period to complete the project.

We designed, and subsequently constructed, a dielectric cell, with capability for temperature range from subambient up to about 200°C. The cell uses helium as an exchange gas due to its high thermal conductivity. The cell is connected to a Quadtech Impedance Analyzer and measurements are performed under computer control using a National Instruments GPIB Board, through programs written in MatlabTM. The cell is located in Science and Technology Center, Room 214 (in part of my research lab space.) With this instrument we are able to probe the molecular motions of biopolymers in the solid state. An externally applied electric field is used to oscillate the electric dipoles in the biopolymer. The frequency response of the material allows us to determine the glass transition temperature, and the impact of crystals on the relaxation time, both of which are important physical parameters characterizing the solid state.

The grant's purpose, to open a new area of research, has been tremendously successful. Prof. David Kaplan, of the Tufts Department of Biomedical Engineering, and I wrote a research grant to the National Science Foundation titled "Silk-Polymer Models for Structure-Function Relationships", which was awarded in 2004 for \$360,000 for three years. This collaboration represents the first time that I have been involved in research in biological materials. The FRAC award I received directly impacted my ability successfully to apply for external funding, in what was a new field for me!

I thank FRAC for providing me with this opportunity.



Peggy Cebe
Professor of Physics

cc. Charlene Carle