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Hydrogen-bond network dynamics in sugar-based glasses MARCUS CICERONE, JERAINNE JOHNSON, NIST, MICHAEL PIKAL, University of Connecticut — Hydrophilic organic glasses composed of sugars and polysaccharides are known to stabilize proteins against aggregation and chemical degradation. It has long been supposed that, due to the long timescales involved in protein aggregation and chemical degradation in the glass, α relaxation processes essentially control the rate of degradation. We have shown that, although there may be > 7 orders of magnitude in time separation, β relaxation processes can dominate in influencing both chemical and physical degradation. Also, it is apparent that these β processes are closely related to dynamics of the hydrogen-bond network in these glasses. In this presentation we will briefly discuss the phenomenology of protein degradation in sugar-based glasses, and also present details of work on developing a fluorescent probe for use as a sensor for dynamics of the hydrogen-bond network in these glasses.

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