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Terahertz dielectric response dependence on protein melting and hydration YUNFEN HE, J.R. KNAB, Physics, University at Buffalo, SUNY, B. SHAH, Chem. Eng., Rutgers University, A.G. MARKELZ, Physics, University at Buffalo, SUNY — Hydration is critical for protein structure stability and flexibility. The hydration dynamics of denatured proteins necessarily plays a significant role in protein folding/unfolding and aggregation. We previously reported the observation of a transition in the THz dielectric response for native state hen egg white lysozyme (HEWL) with hydration. As hydration increases the response slowly increases until at 0.25h (gm water/gm protein) the absorbance and index sharply increase. The frequency range is associated with structural vibrational modes and the hydration level coincides with the filling of the first solvation shell. We present recent THz hydration dependence results as a function of denaturing. The THz absorption coefficient is nearly independent of denaturation while the index of refraction significantly decreases compared to native state and has a stronger frequency dependence with a peak appearing near 0.5 THz. Most significantly the hydration transition at 0.25h is still present for the denatured samples, suggesting the net *bound* water content is nearly identical to the native state.

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