THE ROLE OF WATER IN THZ ABSORPTION BY MYOGLOBIN

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THz absorption was measured for the heme protein myoglobin as a function of water content from 3.6 to 98 percent water by weight, using a THz time-domain spectrometer. Even for dry protein the spectra were dominated by residual water content and predicted protein normal modes peaks were not seen, likely due to inhomogeneous broadening. Careful analysis revealed that the THz absorption per protein molecule increased significantly at the high water content limit, despite the expected decreased polarizability of biological water. This effect may be due to a suppression of protein-protein interactions as higher water concentration increases the mean distance between protein molecules[a].

[a] C. Zhang, and S. M. Durbin, J. Phys. Chem. B 110, 23607 (2006).