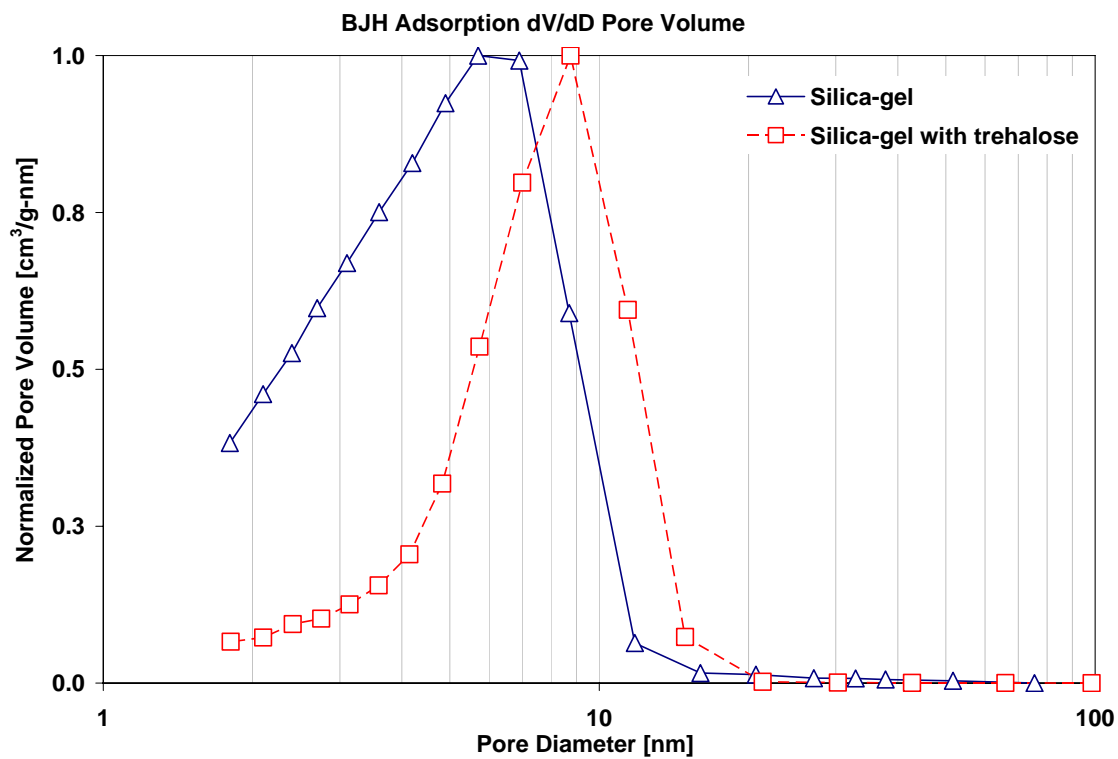
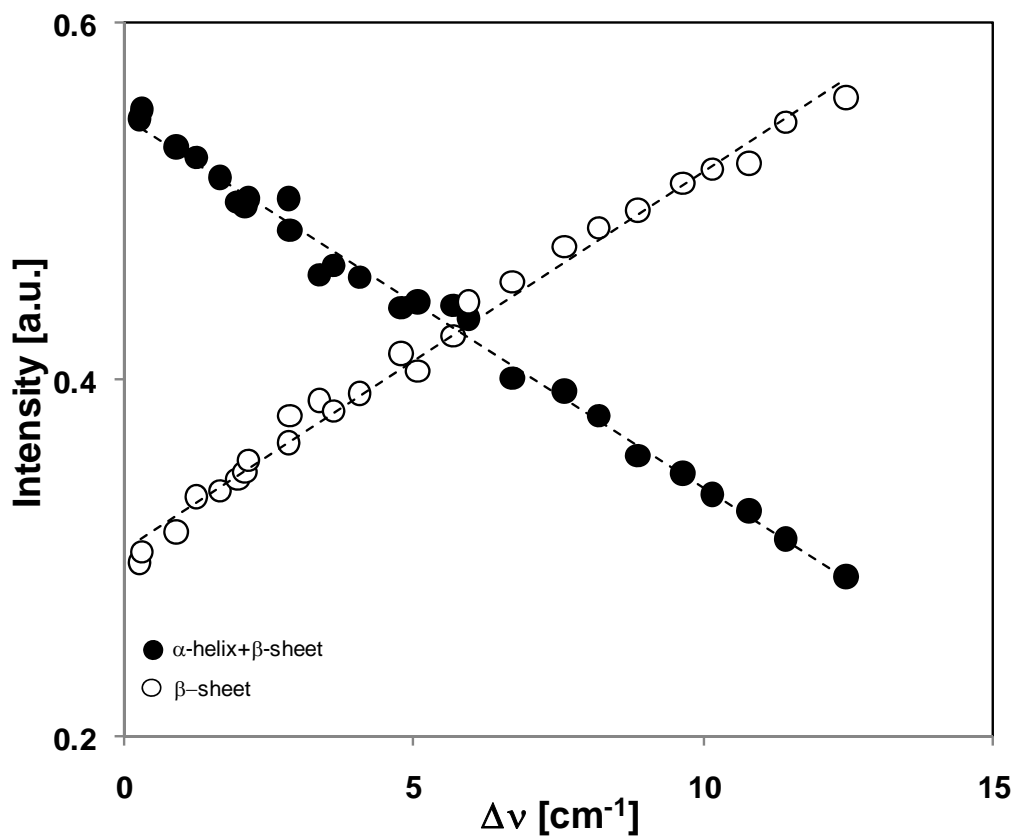


SUPPLEMENTAL DATA

S1: Pore size distribution of silica-gel and silica-gel with trehalose



S2: Correlation of $\Delta\nu$ (change in wavenumber position) with α -helix+ β -sheet and β -sheet intensity

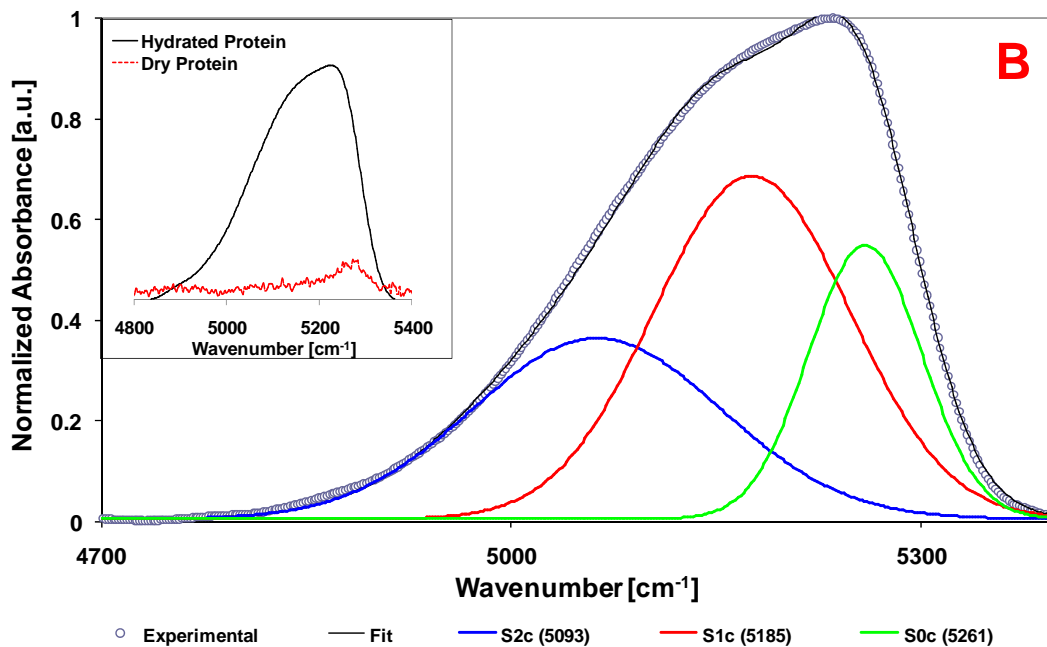
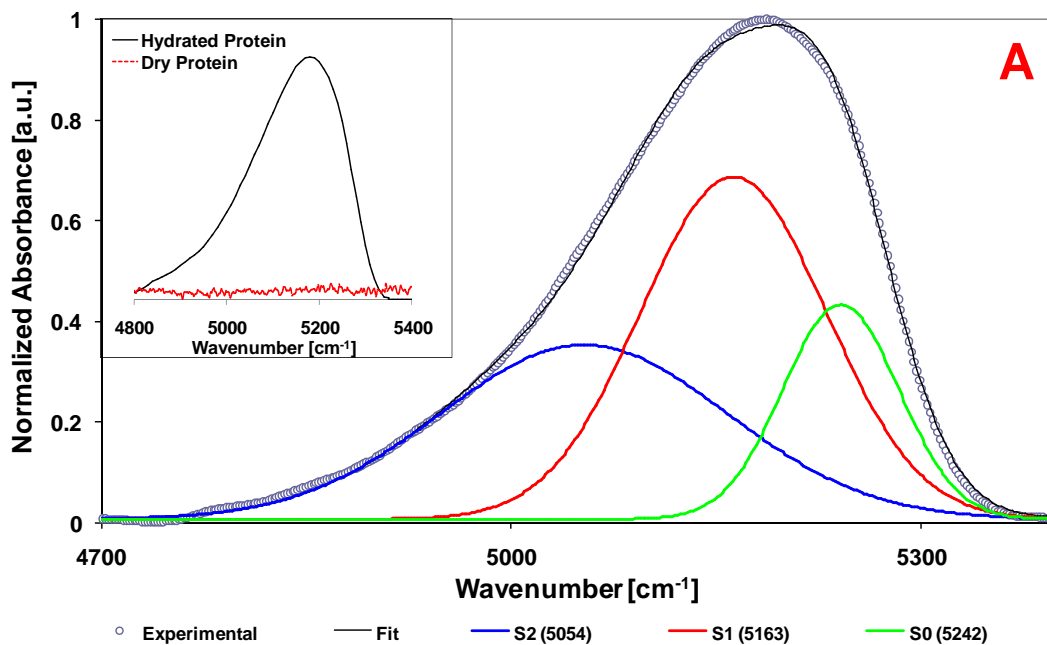


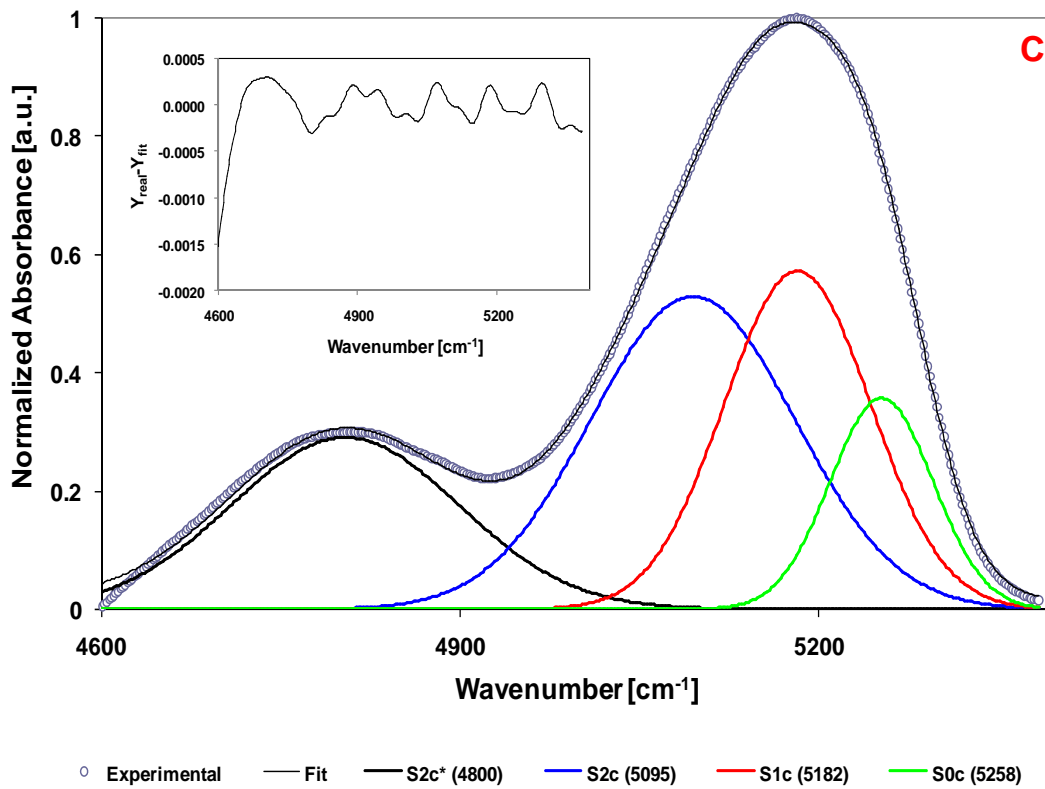
S3: Decomposition analysis of the $\text{NIR}_{\nu_2+\nu_3}$ band

(A) For bulk water.

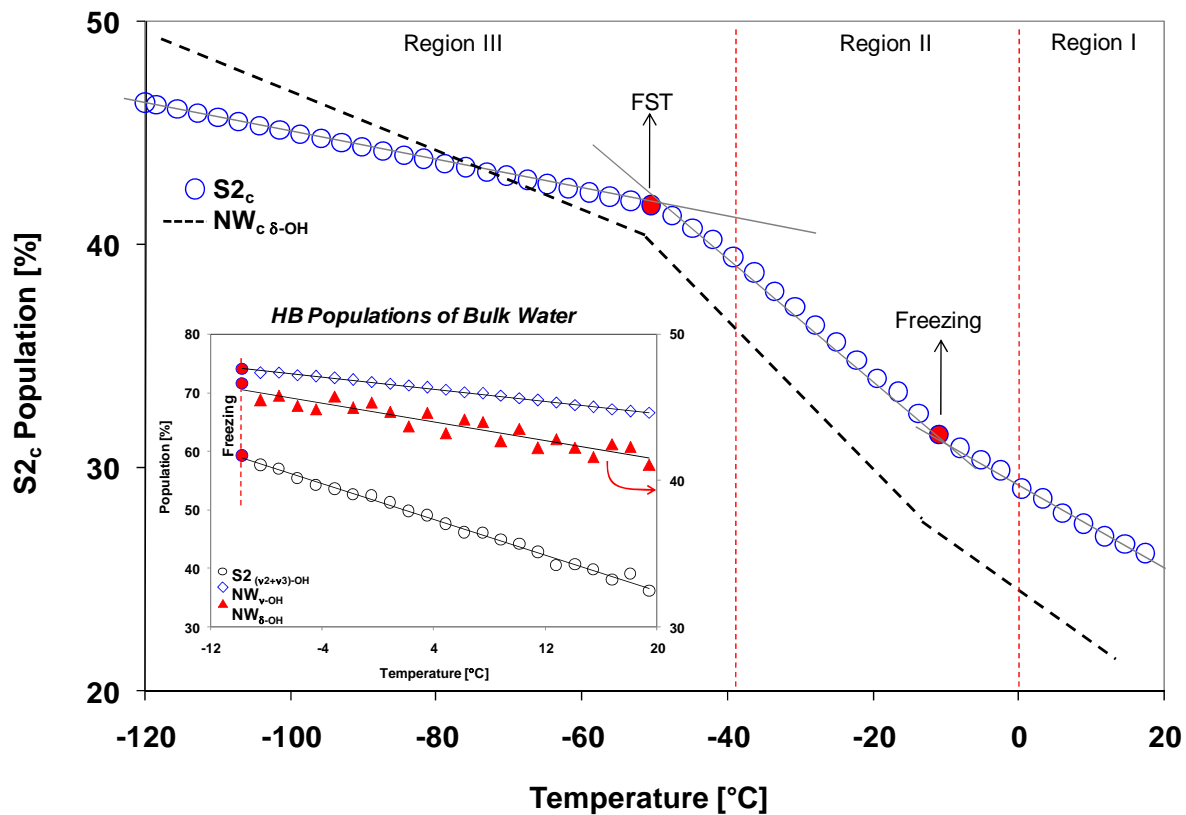
(B) For confined water.

(C) For confined water in the presence of Tre (0.25M). The insert correspond to the residual values of the fitting process.

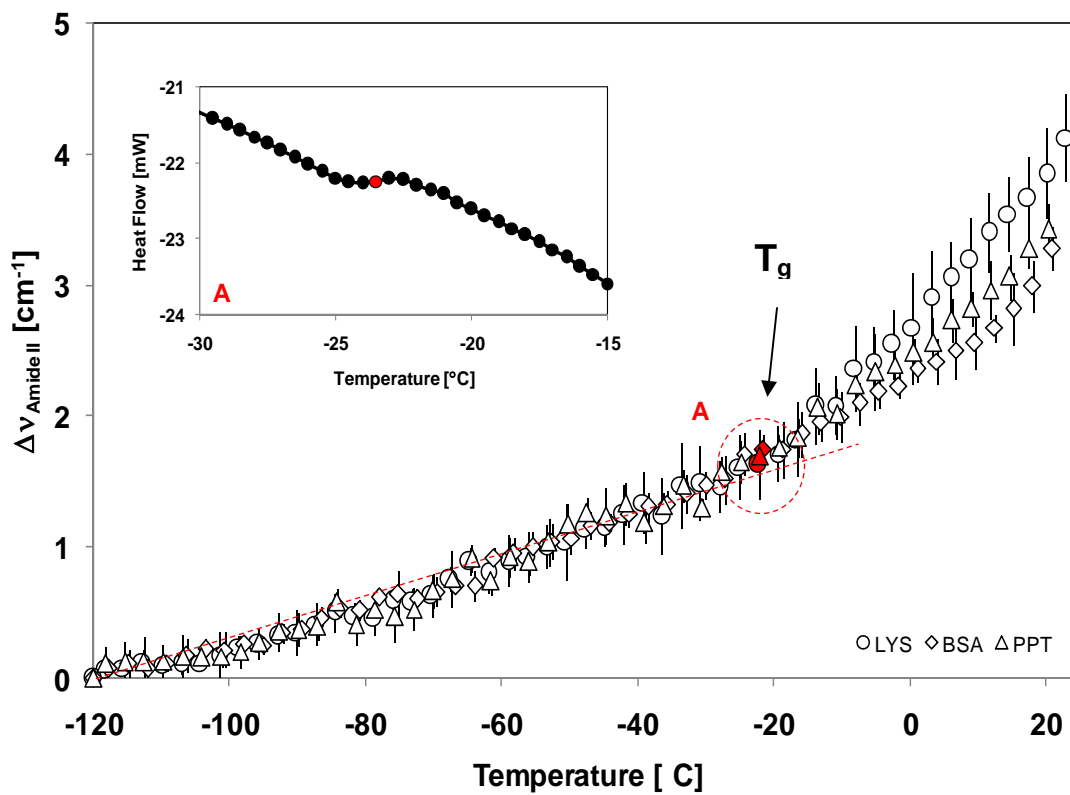




S4: Temperature-induced changes in the $S2_c$ water population. The insert shows the temperature-induced in $S2$, $NW_{\delta-OH}$ and $NW_{\nu-OH}$ for bulk water.



S5: Protein glass transition (T_g)



S6: Solvent accessibility calculation for the model proteins

