

TIME RESOLVED MOLAR VOLUME AND ENTHALPY CHANGES ASSOCIATED WITH FAST FOLDING IN HORSE HEART CYTOCHROME C AT HIGH pH. Randy W. Larsen, Department of Chemistry, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620

In the present report, photoacoustic calorimetry (PAC) has been employed to directly access the ΔH and ΔV values associated with folding processes subsequent to CO photolysis from ferrous Cc under solution conditions thermodynamically favoring the folded conformation of the ferrous protein (350 mM GdnHCl is solubilized in 50 mM carbonate buffer at pH 12.7). Deconvolution of the COCc acoustic waves reveals three kinetic processes with time constants < 50 ns, ~ 660 ns and ~ 2.6 μ s. From the temperature dependence of the acoustic amplitudes the ΔV and ΔH values for these kinetic phases are found to be 13 ± 7 kcal mol⁻¹/1.3 \pm 0.3 mL mol⁻¹, -0.4 ± 2 kcal mol⁻¹/0.1 \pm 0.1 mL mol⁻¹ and 2 ± 4 kcal mol⁻¹/-0.5 \pm 0.1 mL mol⁻¹ for the < 20 ns, 660 ns and 2.6 μ s phases, respectively (using a $\Phi=0.15$ for the prompt phase). Analysis of the volume and enthalpy changes reveal only a small scale collapse on rapid times scales. In addition, the data suggest the non-native ligand binding is enthalpically driven. These results will be discussed within the context of current paradigms for cytochrome c folding.