

PHOTOACOUSTIC CALORIMETRY STUDIES OF CO PHOTORELEASE FROM SOL-GEL ENCAPSULATED HORSE HEART MYOGLOBIN. Randy W. Larsen and Carissa M. Vetromile, Department of Chemistry, University of South Florida, Tampa, Florida, 33620.

Here we present time resolved thermodynamics associated with CO photo-release from horse heart myoglobin encapsulated in a sol-gel glass using photo-acoustic calorimetry (PAC). Upon CO photodissociation from Mbsol-gel a prompt phase with an estimated volume expansion of  $3\pm 1\text{ mL mol}^{-1}$  and endothermic enthalpy change of  $19\pm 5\text{ kcal mol}^{-1}$  is observed and corresponding to Fe-CO bond cleavage and CO migration from the active to an transient interior protein docking site. An exothermic slow phase ( $\tau_s\sim 960\text{ ns}$ ) follows with an enthalpy change of  $-5\pm 4\text{ kcal mol}^{-1}$  with an accompanying expansion of  $3\pm 1\text{ mL mol}^{-1}$  assigned to CO escape from the protein matrix. These results are consistent with a model in which the encapsulated protein adopts a more open conformation that is distinct from the open conformation typically observed at low pH. Interestingly, only the slower phase dynamics are affected by encapsulation.