A STUDY OF DICOBALT OCTACARBONYL ISOMERIZATION VIA ULTRAFAST 2DIR EXCHANGE SPECTROSCOPY

JESSICA M. ANNA and KEVIN KUBARYCH, *Department of Chemistry, University of Michigan, Ann Arbor, MI 48109 (email to J.M.A.: jmanna@umich.edu).*

Two dimensional Infrared (2DIR) spectroscopy probes the carbonyl stretching band near 2000 cm^{-1} to investigate the dynamics of dicobalt octacarbonyl structural rearrangements. At equilibrium, dicobalt octacarbonyl exists as three isomers that can undergo interconversion. The interconversion between two of the isomers is observed through changes in crosspeaks in the 2DIR exchange spectrum with increased waiting time T_W. Isomerization occurs on the 10 ps second timescale, which is considerably faster than the roughly 100 ps vibrational lifetime. Analysis of these crosspeaks yields the rates of interconversion, while temperature dependence enables extraction of the energy barriers between the isomeric forms.