

LIGHT, MOLECULES, ACTION: USING ULTRAFAST UV-VISIBLE AND X-RAY SPECTROSCOPY TO PROBE EXCITED STATE DYNAMICS IN PHOTOACTIVE MOLECULES

R.J. SENSION, *Department of Chemistry, University of Michigan, Ann Arbor, MI, USA.*

Light provides a versatile energy source capable of precise manipulation of material systems on size scales ranging from molecular to macroscopic. Photochemistry provides the means for transforming light energy from photon to process via movement of charge, a change in shape, a change in size, or the cleavage of a bond. Photochemistry produces action. In the work to be presented here ultrafast UV-Visible pump-probe, and pump-repump-probe methods have been used to probe the excited state dynamics of stilbene-based molecular motors, cyclohexadiene-based switches, and polyene-based photoacids. Both ultrafast UV-Visible and X-ray absorption spectroscopies have been applied to the study of cobalamin (vitamin B₁₂) based compounds. Optical measurements provide precise characterization of spectroscopic signatures of the intermediate species on the S₁ surface, while time-resolved XANES spectra at the Co K-edge probe the structural changes that accompany these transformations.