ELECTRONIC EXCITATION SPECTROSCOPY OF THE OH-CO REACTANT COMPLEX

MARGARET E. GREENSLADE, MARIA TSIOURIS, and MARSHA I. LESTER, *Department of Chemistry, University of Pennsylvania, Philadelphia, PA 19104-6323*.

The electronic excitation spectrum of the OH-CO reactant complex in the OH A-X (1,0) spectral region has been investigated using a fluorescence depletion technique. This technique combines infrared overtone excitation of OH-CO at 1.4 μm with ultraviolet excitation of OH-CO between 275 and 300 nm, which induces a fluorescence signal. When the IR and UV transitions originate from a common ground state, the IR excitation reduces the ground state population and causes a depletion in the UV laser induced fluorescence signal. Scanning only the IR laser yields a rotationally resolved infrared spectrum of the pure OH overtone band of OH-CO at 6941.8 cm^{-1}, while tuning only the UV laser results in a broad and relatively unstructured electronic spectrum for OH-CO spanning from 33500 to 36000 cm^{-1}. The electronic spectrum peaks around 34600 cm^{-1} and exhibits a secondary shoulder near 35300 cm^{-1}. The breadth and position of the electronic spectrum reflect the Franck-Condon window on the OH $A^2\Sigma^+$ (v' = 1) + CO excited state potential. The lack of observable structure in the electronic spectrum is attributed to extensive homogeneous line broadening, most likely arising from rapid electronic quenching of OH $A^2\Sigma^+$ by the CO partner. The electronic excitation spectrum observed for the OH-CO will also be compared with analogous spectra obtained for complexes of OH with other partners.