ELECTRONIC PREDISSOCIATION DYNAMICS OF CN(A)-Ne

W. G. LAWRENCE AND M. C. HEAVEN, *Department of Chemistry, Emory University, Atlanta, GA 30322.*

The electronic predissociation process CN(A $^2\Pi_{3/2}$, v=3)-Ne $\rightarrow$ CN(X, v=7) + Ne was characterized using sequential pulse B$\leftarrow$A$\leftarrow$X excitation of the complex. Pump and probe lasers were fixed on specific complex features, and the intensity of the OODR fluorescence signal was monitored as a function of the delay between the laser pulses. Single exponential fits to these data yielded lifetimes in the range of 100-170 ns for A state rotational levels in the range $1/2 \leq J \leq 9/2$. Radiative decay occurs with a lifetime of ≈ 6 μs, and makes a negligible contribution to the decay of the CN(A)-Ne levels examined. Within the experimental error limits, the predissociation rates were linearly dependent on J(J+1). This behavior is characteristic of a mechanism that involves Coriolis coupling. However, the decay rate does not approach the radiative rate at the hypothetical J=0 limit, and it is clear that the dominant predissociation channel does not depend on Coriolis coupling. Extrapolation of the decay rate yields a lifetime of 175 ns for the non-rotating complex. This value is comparable to the lifetime of 91 ns reporting for CN(A, v=3) isolated in solid Ne matrix. Experimental details and a theoretical analysis of the predissociation mechanism will be presented.