LIFETIMES OF THE $\tilde{A}$ STATES OF THE C_3-NE AND C_3-AR COMPLEXES

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Under similar experimental conditions to our previous paper, the fluorescence lifetimes of the $\tilde{A}$ states of C_3-Ne and C_3-Ar have been determined. The uncertainties in the measured lifetimes are estimated to be better than 10%. About 50 perpendicular bands and 11 parallel bands of the $\tilde{A} - \tilde{X}$ system of C_3 were used to probe the fluorescence lifetimes of the Ne and Ar complexes. It is not possible to reduce the backing pressure while measuring lifetimes of the complexes; we therefore reduced the average pressure of the chamber to $1{-}2 \times 10^{-5}$ torr by lowering the repetition rate. No sign of predissociation was found in either complex. Transitions to high vibrational levels of the $\tilde{A}$ state of C_3, above 4500 cm^{-1}, give weak laser-induced fluorescence signals, so that lifetime measurements are not possible for some of these bands. The lifetimes of the levels of the Ne complex lying below 4300 cm^{-1} are generally shorter than 300 ns, except for some levels with C-C stretch excitation. The lifetimes of the Ne complex behave quite similarly to those of C_3. In contrast, the lifetimes of the Ar complex do not follow the vibrational dependence of the lifetimes of C_3 and C_3-Ne. We speculate that the complicated lifetime pattern observed in the Ar complex can be attributed to interactions with nearby triplet levels.