VIBRONIC AND ROTATIONAL STRUCTURE OF THE ASYMMETRIC C-H STRETCH OF METHOXY AND d2-METHOXY RADICALS.

XIAOYONG LIU, VADIM L. STAKHURSKY, ERIC D. OLMON, VLADIMIR A. LOZOVSKY,
TERRY A. MILLER, C. BRADLEY MOORE, Department of Chemistry, The Ohio State University, 120 W. 18th Avenue, Columbus, OH 43210.

Multimode Jahn-Teller analysis of the e modes in the $\tilde{X}$ state of the CH$_2$O radical has been initiated using the SOCJT program$^a$ with special attention being paid to the asymmetric C-H stretch mode ($n_4$) for which there are several relevant experimental observations. Dispersed Fluorescence (DF) spectra have been recorded via excitation of $\tilde{A} 3^3\Pi$ and $4^1\Sigma^+$ combination levels for CH$_3$O. DF spectra have also been obtained upon $3^3\Pi(n = 1, 2)$ LIF excitation for the CHD$_2$O isotopomer. For both isotopomers the observed spectra reveal the quartet vibronic structure in the C-H stretch mode region. The observed quartet structure exhibits a large ($\sim$130 cm$^{-1}$ for CH$_3$O and $\sim$160 cm$^{-1}$ for CHD$_2$O) separation; each component is further split into doublets ($\sim$25 cm$^{-1}$ and $\sim$35 cm$^{-1}$ respectively for CH$_3$O and CHD$_2$O). In addition, the rotationally resolved structure of the $\nu_4$ C-H stretch band of CH$_3$O, recorded via stimulated emission pumping technique was compared with that recently obtained from IR spectra$^b$. The implications of the rovibronic structure for the vibronic assignments will be discussed.
