A SPECTROSCOPIC STUDY OF $CaOCH_3$ USING THE PUMP/PROBE MICROWAVE AND THE MOLECULAR BEAM/OPTICAL STARK TECHNIQUES

KEI-ICHI NAMIKI, J. SCOTT ROBINSON, AND TIMOTHY C. STEIMLE, *Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ 85287.*

The Stark effect on the ${}^{q}R_{22}$(0,0.5) (ν= 17682.9251 cm^{-1}) and ${}^{q}P_{11}$(0,1.5) (ν= 17682.1966 cm^{-1}) branch features of the (0,0)$B^2A_1 - X^2A_1$ band system of calcium methoxide, $CaOCH_3$, was measured and analyzed to give the permanent electronic dipole moments, μ, of 1.58(8)D and 1.21(5)D for the X^2A_1 and B^2A_1 states, respectively. The dipole moments are compared with other monovalent calcium compounds and those predicted from a simple electrostatic model. Pure rotational transitions in the X^2A_1 state were recorded using the pump/probe microwave-optical double resonance technique. The proton magnetic hyperfine splitting pattern confirms that the symmetry of the ground electronic state is C_{3v}. The determined small negative value for the Fermi contact parameter (a_F= -0.419 MHz) is interpreted in terms of spin polarization effects. The determined spin-rotational parameter ($(\epsilon_{bb} + \epsilon_{cc})/2$ = 12.45 MHz) is compared to that of other monovalent calcium compounds and interpreted in terms of the proposed state distribution.