

CARS AND INFRARED STUDIES OF THE ν_1 , ν_2 AND ν_4 BANDS OF $^{34}\text{S}^{18}\text{O}_3$

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We are engaged in a comprehensive investigation of the spectroscopic properties of sulfur trioxide, an important participant in reactions in the upper atmosphere. The fundamental modes and several hot bands of the isotopic variants ($^{32}\text{S}^{18}\text{O}_3$, $^{34}\text{S}^{16}\text{O}_3$, and $^{34}\text{S}^{18}\text{O}_3$) have been investigated using high resolution infrared spectroscopy and coherent anti-Stokes Raman scattering. For all isotopic variants, the Raman-active symmetric stretching mode ν_1 shows complex Q-branch patterns due to indirect Coriolis couplings, l -resonances, and Fermi resonances with dark ν_2 , ν_4 combination/overtone levels. Essential to modeling the interactions of these levels with ν_1 is the understanding of the fundamental vibrations that make up these levels. The analysis of the ν_2 , ν_4 infrared active fundamental vibrations of $^{34}\text{S}^{18}\text{O}_3$ will be presented, along with efforts to model the complex ν_1 CARS spectrum using information derived from studies of hot bands involving ν_2 and ν_4 .