

LINE INTENSITY MEASUREMENTS AND ANALYSIS IN THE ν_3 BAND OF RUTHENIUM TETROXIDE

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Ruthenium tetroxide (RuO_4) is a heavy tetrahedral molecule characterized by an unusual volatility near ambient temperature. Because of its chemical toxicity and the radiological impact of its ^{103}Ru and ^{106}Ru isotopologues, the possible remote sensing of this compound in the atmosphere has renewed interest in its spectroscopic properties. In a recent study, the strong fundamental band associated with the excitation of the infrared active stretching mode ν_3 of $^{102}\text{Ru}^{16}\text{O}_4$, observed near $10\ \mu\text{m}$, was re-investigated at high-resolution ($0.001\ \text{cm}^{-1}$) with the help of a ^{102}Ru isotopically pure sample.^a Building upon that work, the present contribution is the first investigation dealing with high-resolution line-by-line intensity measurements for the ν_3 fundamental band of $^{102}\text{Ru}^{16}\text{O}_4$. It relies on high resolution Fourier transform infrared spectra specifically recorded at room temperature at the AILES beam line of SOLEIL using synchrotron radiation, a specially constructed cell and an isotopically pure sample of $^{102}\text{Ru}^{16}\text{O}_4$. Relying on an effective Hamiltonian and associated effective dipole moment,^a the measured line intensities were assigned and dipole moment parameters determined. A HITRAN-formatted frequency and intensity line list was generated.

^aS. Reymond-Laruinaz, V. Boudon, L. Manceron, L. Lago, D. Doizi, *J Mol Spectrosc* 315 (2015) 46–54.