LINE INTENSITIES OF ISOTOPIC CARBONYL SULFIDE (OCS) AT 2.5 MICROMETER

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We have measured line intensities of $^{16}O^{12}C^{32}S$, $^{16}O^{13}C^{32}S$, $^{16}O^{12}C^{33}S$, $^{16}O^{12}C^{34}S$, and $^{18}O^{12}C^{32}S$ in the 2.5 μm region for the first time to support planetary studies of the Venus atmosphere. Laboratory absorption spectra of OCS were recorded at 0.0033 cm^{-1} resolution at room temperature using a Bruker IFS 125-HR Fourier transform spectrometer at the Jet Propulsion Laboratory. Normal samples of OCS were used in this study, and sample impurities and isotopic abundances were determined from mass spectrum analysis. Optical densities sufficient to observe isotopic bands and weaker hot bands were achieved by using a multi-pass White cell and single pass gas cells in various path lengths, which were validated by analyzing near-IR CO_2 spectra. We present line intensities for almost 30 bands of the OCS isotopes excluding ground state bands of $^{16}O^{12}C^{32}S$, which we have reported recently. We have Herman-Wallis factors determined for the individual bands. In some cases, it has been observed that band intensities normalized to 100% isotopic species show a significant deviation from that of the primary isotopic species (up to by 12.5%). No earlier measurements have been reported for these bands. Measurement precision and accuracies will be discussed.[a]

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