

HIGH-RESOLUTION CAVITY ENHANCED ABSORPTION SPECTROSCOPY OF CARBON DIOXIDE AND METHANE AT 1.5 μm

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High-resolution absorption spectra of carbon dioxide (CO_2) and methane (CH_4) at 1.5 μm have been studied using the sensitive technique of cavity enhanced absorption spectroscopy (CEAS) with an ultra-high finesse cavity. Absorption spectra of CO_2 and CH_4 between 6390 ~ 6570 cm^{-1} were recorded at room temperature with pressures of less than 5 torrs. The spectral linewidth measured is about 0.012 and 0.020 cm^{-1} respectively for CO_2 and CH_4 , which agree well with the Doppler linewidth predicted at room temperature. The transition intensity of these lines are measured to be about $\sim 1 \times 10^{-26}$ $\text{cm}^{-1}/(\text{molecule} \cdot \text{cm}^{-2})$ for both CO_2 and CH_4 . Analysis of the obtained spectra of CO_2 and CH_4 is in progress.