ON COLLISION-INDUCED ABSORPTION IN PURE O_2, CO_2, AND CO_2 - O_2 MIXTURES.

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The NIST high-pressure absorption cell coupled to a DA002 Fourier-transform spectrometer has been modified in order to extend the lower temperature range of the measurements. Measurements of collision-induced absorption (CIA) of pure O_2 and CO_2 as well as CO_2 - O_2 mixtures have been recorded from room temperature down to -80° C. The spectra of compressed CO_2 in the ν_1 - 2 ν_2 infrared inactive Fermi dyad region consist of two anharmonically-coupled bands. Each of these bands includes a featureless CIA band on top of which is superimposed a distinctive CO_2 dimer band. These dimer bands increase in intensity with decreasing temperature but surprisingly persist up to room temperature. Spectra of mixtures of CO_2 and O_2 have also been obtained. As CO_2 is added to pure O_2 in the absorption cell, the intensity of the O_2 fundamental band grows rapidly. At higher CO_2 concentrations, the band narrows and unresolved ro-vibrational structure appears at the center. Its appearance indicates that a fairly strongly bound $O_2{}^{\cdots}CO_2$ complex is formed. Attempts are presently underway to model the observed van der Waals complexes as well as the structureless CIA profiles. Binary absorption coefficients have been derived for all species studied at 0.25 cm^{-1} intervals over the range 1100 to 1800 cm^{-1}.