To enable column CO$_2$ measurements from space with 0.3% precisions by the Orbital Carbon Observatory, positions and intensities were measured for 125 near-IR CO$_2$ bands using Voigt line shapes. Self- and air-broadening coefficients were obtained for the stronger bands as well. In addition, measurement of the 30012 - 00001 band at 6348 cm$^{-1}$ was repeated using constrained multispectrum fitting employing a speed dependent Voigt profile and the off-diagonal relaxation matrix elements (RME) formulation for line mixing. For this, high resolution, high signal-to-noise ratio spectra were recorded at room temperature with the McMath-Pierce Fourier transform spectrometer on Kitt Peak.

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