We have begun a systematic reinvestigation of the CO$_2$ spectrum in the 4000 - 9000 cm$^{-1}$ range using the McMath-Pierce Fourier transform spectrometer at the Kitt Peak National Solar Observatory. Fits to more than 100 vibrational bands illustrate that it is possible to obtain rms uncertainties as low as $2 \times 10^{-5}$ cm$^{-1}$ for strong bands and uncertainties better than $2 \times 10^{-4}$ for all bands with $S^0 > 0.01 \times 10^{-22}$ cm$^{-1}$/molecule cm$^{-2}$). We will also present the first analysis of several $^{18}$O$^{12}$C$^{18}$O and $^{16}$O$^{13}$C$^{18}$O bands. All results will be compared to the data available in the HITRAN database and evaluated relative to the needs of atmospheric remote sensing.

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