Self-broadening coefficients of transitions of CH_3F

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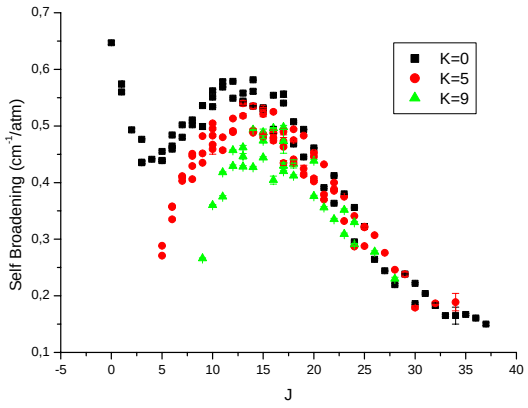
Methyl Fluoride is still used in semiconductor industry as refrigerating gas and in engraving processes. Its atmospheric concentration has to be controled because of its strong global warming potential (GWP ≈ 100) and its important life time in the earth atmosphere (3 years)[1]. It has been previously studied in few papers [2,3]. Prior to a precise quantification of CH_3F in the atmosphere, the accurate determination of line profile parameters is required. These parameters have to be determined from laboratory experiments. For a symmetric-top molecule like CH_3F, numerous measurements have to be performed in order to reach transitions with various J and K values and to obtain the rotational J and K dependences of line broadening coefficients. This work is devoted to the study of room-temperature CH_3F self-broadening coefficients. They have been retrieved for the transitions of the ν_6 band around 1200 cm^{-1} from the analysis of high resolution Fourier-transform (FT) spectra.



790 self-broadening coefficients have been measured for 0 < J < 34 and 0 < K < 12 values using a multispectrum fitting procedure [4].

The figure plots few examples of J dependence for a fixed K value, the trends will be discussed and compared with those of other CH_3X species [5,6].

The observed J- and K- rotational dependences have been modeled using a second-order polynomial with empirical coefficients deduced from fitting of the various measured data. The so-obtained list aims to quickly compute high accuracy self broadening for all transitions in the ν_6 band for 0 < J < 34 and 0 < K < 12.

Some preliminary results concerning the intensities determination will also be presented.

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