# Temperature dependence of the CO2-collisional broadening of chloromethane lines.

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The climate change problematic has become a front-page news over the recent years. In this respect, it is mandatory to understand and quantify the evolution of pollutants in our atmosphere, such as the chloromethane, which is one of the main ozone depleting substances. For a better understanding of our atmosphere, we need accurate spectroscopic parameters, in particular, the collisional broadening coefficients.

In order to measure chloromethane collisionnal broadening coefficients at high temperature, we developed and realized a multipass absorption cell. This cell enables the study of line profiles and the determination of line shape parameters from room temperature up to more than 700°C. Its long and adaptable optical pathlength makes this cell a versatile tool.

The measurements have been realized using high-resolution spectrometers, based on diode-lasers and quantum cascade lasers, and equipped with various absorption cells. The coefficients of collisional broadening of lines, for chloromethane diluted in carbon dioxide, have been measured at various temperatures comprised between -100 and 300°C**.** With these measurements, we have precisely studied the temperature dependence of collisional broadening coefficients.

The temperature dependence of collisionnal broadening coefficients has been deduced from the classical empirical law but also from the physics based model developed recently by Gamache and Vispoel. Our results show that this newly law reproduces well these dependences.

The obtained results are important for the remote sensing of atmospheres (Earth, Mars, ...), the study of combustion residual gases and a better understanding of collisional processes in the gas phase.