

Microwave study of α -pinene-oxide with the new CP-FTMW spectrometer in Lille

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The introduction of the chirped-pulsed Fourier transform microwave spectrometer (CP-FTMW) by the group of Brooks Pate¹, was a breakthrough in terms of flexibility, speed and bandwidth, that revolutionized the field of microwave spectroscopy. Here we present a newly constructed CP-FTMW spectrometer operating in the range 6-18 GHz. A fast-arbitrary waveform generator (Keysight M8195A 65 GSa/s) is used to generate the 4 μ s chirped pulse. A fast oscilloscope (Keysight DSOZ634A 160 GSa/s) is employed to record the molecular Free Induction Decays (FID). The large memory and high acquisition speed of the oscilloscope permit to record for longer times (up to 80 μ s), thus achieving high spectral resolution (FWHM better than 40 kHz). The present setup has been characterized and is used to study molecules of atmospheric interest. The rotational study of α -pinene-oxide will be presented in detail, as well as its geometrical structure, with the support of quantum chemical calculations.

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References

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