SPECTROSCOPIC STUDY OF BUFFER GAS COOLED METHANOL IN THE 2OH STRETCHING RANGE

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Methanol ($\mathrm{CH_3OH}$) is a six-atoms asymmetric top molecule presenting internal rotation. The size of this molecule and the presence of a large amplitude motion lead to a dense rotational structure. This structure gets even more complicated when one goes up in energy with vibrational excitations. Due to its complicated spectrum, this molecule remains poorly known, especially in the near-infrared. This frequency range was recently explored by Svoboda *et al.*(*Phys. Chem. Chem. Phys.*, **17** (2015) 15710) and by Rakvský *et al.* (*Phys. Chem. Chem. Phys.*, **23** (2021) 20193), probing the 2OH stretching vibration overtone around 7200 cm^{-1}.

In this contributed talk, we will present the measurement of the full $2\nu1$ vibration overtone around 7200 cm^{-1} cooled down to 20 K with a buffer gas cooling setup coupled to a Cavity ring down spectrometer with a sensitivity of $\alpha_{\min} = 2\times10^{-10}\mathrm{cm}^{-1}$. The two elements of the built in-house apparatus are first briefly introduced. The assignment procedure is then detailed. It is based on the extension of the ground state combination differences method (GSCD) to all the allowed transitions that lead to a same upper energy state. Indeed, these transitions form a unique pattern spaced on the wavenumber axis by the differences in energy between the involved lower energy states. This method was first presented by Rakvský *et al*. We discuss the use of the intensities as an additional criterion to decide between correct assignments and fortuitous detection of the pattern on the experimental spectrum.