# Dynamic registration of $D_2{}^{16}O$ absorption spectrum in Silica Aerogel

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The absorption spectra of $D_2{}^{16}O$ in 3600-4800 $cm^{-1}$ were recorded in gas phase and in nanoscale pores 50 nm wide in the silica aerogel using Fourier Transform spectrometer IFS-125M with spectral resolution of 0.01…0.03 $cm^{-1}$. Absorption cell with an absorption path of 2.5 cm was used to study the absorption spectra at room temperature and pressure of 15 and 30 mbar. The pure $D_2O$ vapor line half widths are in good agreement with the work [1].

The cell was completely filled with gel. It was found that the $D_2{}^{16}O$ line halfwidths in the gel slightly exceed those of pure vapor.

The self-broadening coefficients of the $D_2{}^{16}O$ lines were determined from the experiment and calculations of self-broadening coefficients of vibration-rotation lines of water molecules were performed using semi-empirical method. The calculated results well agree with experimental data.

Simultaneously spectrum of liquid phase of water was recorded in 4200-5500 $cm^{-1}$ region. It was found that cleaning the gel by dry nitrogen leads to increasing hydrophilic properties of the material.

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[1] T. Svensson, M. Lewander, S. Svanberg, *Optics Letters* **2010**, *18*, 16460-16472.