HIGH RESOLUTION FOURIER TRANSFORM SPECTRUM OF H_2S IN THE 5700-7900 CM^{-1} REGION

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The high resolution absorption spectra of hydrogen sulfide have been recorded with spectral resolutions of 0.006, 0.012, and 0.021 cm^{-1} using Fourier transform spectrometer at Kitt Peak National Observatory [1]. As a result of the spectrum assignment more than 2400 precise energy levels were derived for the 2nd hexad and 1st decade interacting states of $H_2{}^{32}S$, $H_2{}^{33}S$, and $H_2{}^{34}S$ isotope species, including highly excited (040) and (050) states.

The energy levels were modeled using A-reduced Watson-type rotational Hamiltonian with taking into account Coriolis, Darling-Dennison and weak Fermi- resonance inside polyads of interacting states. An average accuracy of the energy levels fitting for the main isotope species is 0.0018 cm^{-1} and 0.0019 cm^{-1} for the 2nd hexad and the 1st decade respectively. New evaluation of the band origins of the dark (012) and (220) states is obtained from the fitting process which agree well with recent predictions of Ref. [2].

The observed intensities were modeled within the experimental error using the approach developed in [3] and wavefunctions derived in the process of the energy levels fitting. Transition intensities for the $H_2{}^{33}S$ and $H_2{}^{34}S$ isotopes were evaluated using the $H_2{}^{32}S$ transition moment parameters and true wavefunctions. Intensities of the hot band (220)-(010) transitions were estimated from the corresponding data for the ‘cold’ band as in Ref. [4].

Detailed and accurate H_2S absorption linelist in the 5700 – 7900 cm^{-1} spectral region was generated in the HITRAN format.

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