FTMW SPECTROSCOPY OF AlSH AND AlSD

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We have observed AlSH and AlSD for the first time using the technique of Fourier transform microwave spectroscopy. AlSH (AlSD) was produced in supersonic free jet expansions by reaction of H_2S (D_2S) with laser ablated Al atoms. The spectral search was guided by an $ab\ initio$ computional prediction performed prior to the experiments. The lowest frequency rotational transition, 1_{01} - 0_{00}, was measured and the hyperfine structure due to the nuclear spin of ^{27}Al was analyzed. By comparing the obtained rotational constant, $\frac{1}{2}$(B+C), with the computational prediction, it was concluded that AlSH has a bent structure with a bond angle close to 90°. Using the nuclear electric quadrupole and nuclear spin-rotation coupling constants obtained, the electronic structure of AlSH was investigated.

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