

TERAHERTZ SPECTROSCOPY OF CaH

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Calcium monohydride CaH is an astronomical molecule identified in the Sun and other stars by using the visible transitions. We have found many new vibrational levels of the $A^2\Pi$, $B/B'^2\Sigma^+$, and $1^2\Delta$ state using laser induced fluorescence (LIF) from visible to ultraviolet region. ^{a, b c d} The pure rotational spectra of the ground state have been measured and analyzed, including the hyperfine structure. ^{e, f} However, the N range was limited to $N = 2 - 1$ and the highest frequency was about 500 GHz. In this study, we will report our new measurement in the terahertz region.

The terahertz spectra were taken by using tunable far-infrared spectrometer at University of Toyama. Calcium monohydride was produced in a quartz cell where Ca vapor was introduced by heating Ca at 750°C and DC discharge was applied under H₂ and He (or Ar) gas environment. The highest frequencies of the ground state and vibrationally excited state are approximately 3.7 THz and 1.9 THz, respectively.

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