THE GIGAHERTZ AND TERAHERTZ SPECTRUM of MONO-DEUTERATED OXIRANE (c-C_2H_3DO)

SIEGHARD ALBERT, ZIQIU CHEN, KAREN KEPPLER, *Laboratory of Physical Chemistry, ETH Zurich, Zürich, Switzerland*; PHILIPPE LERCH, *Swiss Light Source, Paul Scherrer Institute, Villigen, Switzerland*; MARTIN QUACK, *Laboratory of Physical Chemistry, ETH Zurich, Zürich, Switzerland*; VOLKER SCHURIG, *Institute of Organic Chemistry, University of Tubingen, Tubingen, Germany*; OLIVER TRAPP, *Department of Chemistry, Ludwig Maximilians University, Munich, Germany*.

The rotational spectrum of the chiral mono-deuterated oxirane c-C_2H_3DO, an isotopomer of oxirane (ethylenoxide), of which the normal isotopomer has already been detected in interstellar clouds, was measured in the ranges 78 to 108 GHz and 25 to 70 cm^{-1}. Thus one can expect that c-C_2H_3DO will be detectable in space in the future given the current accurate laboratory data.c-C_2H_3DO is also of interest as a simple prototypical molecule for isotopic chirality and parity violation.[a,b,c,d] The Zurich GHz spectrometer and a high resolution FTIR interferometer using synchrotron radiation was used for the THz spectrum.[d,e,f] Previous laboratory work on the rotational spectrum of deuterated oxirane extended only to the frequency of 45 GHz. A total of 119 transitions have been newly assigned in the GHz range (extended to 119 GHz) up to J=18 and 900 transitions in the THz region at most to J=70. The analyses of the rotational spectra shall be discussed in detail in relation to their astrophysical importance.

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