RO-VIBRATIONAL SPECTROSCOPY OF LINEAR C_3H^+

PHILIPP C SCHMID, THOMAS SALOMON, SVEN THORWIRTH, OSKAR ASVANY, STEPHAN SCHLEMMER, *I. Physikalisches Institut, Universität zu Köln, Köln, Germany*.

The C_3H^+ ion has been identified as an important reaction intermediate in the carbon chemistry network in the interstellar medium and was recently detected via its rotational lines[a]. Laboratory measurements on the rotational spectrum of linear C_3H^+ provided accurate spectroscopic parameters for the vibrational ground state[b]. In addition, vibrational predissociation spectroscopy of the linear C_3H^+-Ne complex offered first insights on the vibrational band positions of this molecule[c].

Here, we report on the first infrared study of C_3H^+ at high spectral resolution that was targeted at the C−H stretching mode ν_1 located around 3170 cm^{-1}. The experiment was performed in our cryogenic multipole 22-pole ion trap instrument LIRtrap. In addition to the vibrational fundamental, the associated $\nu_1 + \nu_5 \leftarrow \nu_5$ hot band originating from the energetically lowest bending mode could be detected. Both spectra are in good agreement with estimates based on previous quantum-chemical calcultions and low-resolution measurements.

---

[a] J. Pety et al., A&A 548(2012)A68., B. McGuire et al., Ap. J. 774(2013)56.

[b] S. Brünken et al., Ap. J. Lett. 783(2014)L4.

[c] S. Brünken et al., J. Phys. Chem. A 123(2019)8053.