

## ROVIBRATIONAL LOWEST BENDING MODE TRANSITIONS OF THE PROPYNYLDYNE RADICAL

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Precise measurements on rovibrational transitions of the  $\nu_4(^2\Sigma^u)$  CCH bending mode of ( $X^2\Pi$ )  $C_3H$  have been performed using the Cologne Supersonic Jet Spectrometer for Terahertz Applications (SuJeSTA). The molecules were formed in a supersonic jet expansion when a gas mixture of  $C_2H_2$  and CO diluted in He was introduced to an electrical discharge nozzle. Radiation of a backward wave oscillator (BWO) probes the molecular beam 40 mm downstream and spectra in the frequency range 360-600 GHz were recorded.

A strong Renner-Teller coupling effect shifts the ( $^2\Sigma^u$ ) component of the  $\nu_4$  bending mode towards lower energies and into the submillimeter region. Pure rotational transitions in the  $^2\Pi_{1/2}$  and  $^2\Pi_{3/2}$  ground state levels and in the  $\nu_4 = 1$  ( $^2\Sigma^u$ ) excited vibration state were recorded, extending earlier data published by Yamamoto *et al.*<sup>a</sup> In addition, some rovibrational transitions between the ground state and the  $\nu_4 = 1$  ( $^2\Sigma^u$ ) state have been identified. Thus the vibrational energy of the  $\nu_4(^2\Sigma^u)$  state was determined precisely as 609977.1(42) MHz or 20.34664(14)  $cm^{-1}$ . Furthermore, the Coriolis coupling constant between the ground and  $\nu_4(^2\Sigma^u)$  state has also been determined with greatly improved precision.

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<sup>a</sup>S. Yamamoto, S. Saito, H. Suzuki, S. Deguchi, N. Kaifu, and S. Ishikawa, *Ap. J.* 348, 363-369 (1990)