

HIGH RESOLUTION FAR-INFRARED SPECTROSCOPY OF TRANS- AND GAUCHE-BUTADIENE

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Much attention has surrounded 1,3-butadiene because this conjugated diene, the simplest of all, is an ideal candidate to observe the effects of π -electron delocalization, and because the species is of central importance in a wide range of chemistry applications. Butadiene exists in two forms, the most stable planar *trans* and the long-elusive *gauche* lying 12 kJ/mol higher in energy. The later was only conclusively detected in the gas phase by some of us recently, in a work that allowed the determination of a partial structure from a combination of pure rotational measurements and high level quantum chemical calculations.

In an attempt to detect the ro-vibrational spectrum of *gauche*-butadiene, we have re-investigated the far-infrared spectrum of the species at both the SOLEIL synchrotron facility and the Canadian light source using three experimental set-ups allowing to reach rotational temperatures ranging from 30 to 350 K. We will present our results on new fundamentals of the *trans* form, and on the *gauche* form.