

A TORSION-VIBRATION COMBINATION BAND IN METHANOL FOR A CH STRETCH VIBRATION WITH INVERTED TORSIONAL STRUCTURE

INDRANATH MUKHOPADHYAY, DAVID S. PERRY, *KNIGHT CHEMICAL LABORATORY, UNIVERSITY OF AKRON, AKRON, OH, 44325*; VELI-MATTI HORNEMAN, *DEPARTMENT OF PHYSICAL SCIENCES, UNIVERSITY OF OULU, P.O. BOX 3000, FINLAND-90014*.

Recently a local mode theory was employed by Wang and Perry [1] to explain the inverted torsional energy level structure ( $'A'$  above  $'E'$ ) in the asymmetric CH stretch vibrational states of methanol. In order to investigate the torsional energy level structure of these vibrations, we looked for transitions reaching the first excited torsional state ( $v_t=1$ ) in these vibrational states. High resolution Fourier transform spectra of methanol were recorded at Doppler limited resolutions (typically  $0.004 \text{ cm}^{-1}$ ), around the CH-Stretch fundamental region, at a maximum effective path length of 96m and a pressure of about 0.8 torr in various runs. The spectrum exhibits excellent S/N even when the intensity falls below about 1 percent of the fundamental band. Despite the weak and complicated spectral pattern it was possible to identify a substantial number of  $K$  sub-bands terminating at the  $v_t=1$  asymmetric CH-stretch levels. Results of the analysis will be presented in terms of torsional vibrational energy as a function of axial rotation and torsional energy splitting.

[1] X. Wang and D.S. Perry, *J. Chem. Phys.* Vol. 109, 10795-10805 (1998).