NOVEL PATTERNS OF TORSION - INVERSION TUNNELING AND TORSION - ROTATION COUPLING IN THE ν_{11} CH - STRETCH REGION OF CH_3NH_2

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The high-resolution infrared spectrum of CH_3NH_2 has been recorded using slit-jet absorption spectroscopy in the ν_{11} asymmetric CH-stretch region ($2965\ to\ 3005\,\mathrm{cm}^{-1}$) with resolution of $0.003\,\mathrm{cm}^{-1}$. The 580 lines, assigned by ground state combination differences, represent 27 subbands with $|K'| \leq 2$ for the A, B, E_1 and E_2 symmetries. Several of the observed subbands are split by perturbations. The analysis of spectrum shows that the patterns of the torsion-inversion tunneling splittings are qualitatively different from the ground state. In addition, the low - J splittings between $|K'| = +|K'|$ and $-|K'|$ are greatly reduced relative to the ground state in both the E_1 and the E_2 species, indicating that torsion-rotation coupling is suppressed in the ν_{11} CH-stretch excited state.

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