HIGH RESOLUTION UV SPECTROSCOPY OF 4-DIMETHYLAMINOBENZONITRILE

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The molecule 4-dimethylaminobenzonitrile (DMABN) is studied extensively by many groups. Nevertheless, there are many questions left. For example: what is the geometrical structure in the electronic ground state and in the excited state? Furthermore, there is some confusion about the value of the life time of the excited state. Based on rotational band contour analysis, Saldago et al (JPC A 103 (1999) 3184) determined the life time of the various vibrational energy levels in the S_1 state to be in the picosecond range (1.5-24 ps). But other groups think that the life time is on the nanosecond time scale.
Ultrahigh resolution laser induced fluorescence (LIF) spectroscopy is a powerful tool to obtain more detailed information on the geometrical structure and excited state lifetime of molecules. We have investigated two rovibronic bands of DMABN using UV LIF in combination with a molecular beam. Since the measured spectra show rotationally resolved transition, it is immediately clear that the life time is not in the picosecond range. A detailed analysis provides the rotational constants in the ground and the excited states.

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