FLUORESCENCE-DIP INFRARED SPECTROSCOPY OF METHOXY RADICAL

JINJUN LIU, LILY ZU, WEIDONG ZHOU, VLADIMIR LOZOVSKY, PATRICK DUPRÉ, C. BRADLEY MOORE AND TERRY A. MILLER, *Laser Spectroscopy Facility, Department of Chemistry, The Ohio State University, Columbus, OH 43210*.

The fluorescence-dip infrared (FDIR) spectrum of methoxy radical (CH_3O) has been recorded in the region 2875-2980 cm^{-1}. Methoxy radical was produced by the photolysis of methyl nitrite (CH_3ONO) in a pulsed free-jet expansion. The laser induced fluorescence (LIF) spectrum obtained was characterized by a rotational temperature of $\sim$2K. In the FDIR experiment, the UV excitation laser was tuned to the rotational transition, N$'$=1, K$'$=0 $\leftarrow$ J$''$=3/2, P$''$=3/2 of the $\widetilde{A}\ ^2A_1 \leftarrow \widetilde{X}\ ^2E_{3/2}$, 0-0 band. Two IR sources were used to deplete the ground-state level: difference frequency mixing and an optical parameter oscillator (OPO). The FDIR spectrum is detected as dips in fluorescence as a function of IR frequency. The correlation between the FDIR spectrum, the IR absorption spectrum,[a] the stimulated emission pumping (SEP) spectrum and the dispersed fluorescence (DF) spectrum will be discussed.

[a] Jia-xiang Han, Yu. G. Utkin, Hong-bing Chen, L. A. Burns, and R. F. Curl, *J. Chem. Phys.* **117**, 6538, (2002)