DOPPLER-LIMITED CW INFRARED CAVITY RINGDOWN SPECTROSCOPY OF THE OH+CH STRETCH COMBINATION BAND OF JET-COOLED METHANOL

SHUCHENG XU, JEFF KAY, and DAVID PERRY, *Department of Chemistry, University of Akron, Akron, OH 44325*.

A high resolution cavity ringdown spectrometer (CRDS) has been constructed using a continuous-wave external-cavity diode laser tunable in the range of 1510 nm - 1580 nm, together with a mode-matched near-confocal ringdown cavity, and 2 cm slit jet. A simple design for this CRDS system without a locking circuit is demonstrated. Resonances of the laser frequency with the ringdown cavity are generated by repetitively scanning the cavity PZT, and the ringdown signal is produced by switching the laser beam with an acousto-optic modulator. The pulsed jet is synchronized with these resonances by controlling the delay time between valve pulses, and a gating circuit is applied to ensure that ringdowns are only recorded when the gas pulse is present. Without signal-averaging, the RMS noise in the absorption signal is 1.7×10^{-9} cm^{-1}. The rotationally resolved overtone spectrum of an OH+CH stretch combination band of methanol between 6510 and 6550 cm^{-1} is reported.