NEAR INFRARED MEASUREMENTS OF VOLATILE ORGANIC COMPOUNDS USING DIODE LASER CAVITY RINGDOWN SPECTROSCOPY

SUSAN T. SCHERRER and CHUJI WANG, *Diagnostic Instrumentation and Analysis Laboratory, Mississippi State University, Starkville, MS 39759*; CHRISTOPHER B. WINSTEAD, *Department of Physics and Astronomy, University of Southern Mississippi, Hattiesburg, MS 39406*.

Absorption cross-sections of the C-H stretching overtones of benzene, chlorobenzene, 1,2-dichlorobenzene, and toluene have been measured in the NIR (5970 to 6135 cm^{-1}) using CW-Cavity Ringdown Spectroscopy. The wavelength-dependent absorption cross-sections were obtained with both an external cavity diode laser and a free space DFB diode laser. Low-pressure samples (0.01 to 2.0 Torr) were introduced into an evacuated cavity. The experimental room temperature absorption cross-sections obtained for these four volatile organic compounds were found to vary in intensity from approximately are 1.2 x 10^{-22} to 6.9 x 10^{-21} cm^{2}, depending on the wavelength and molecular structure. The substitution of 1 or 2 Cl atoms causes a spectral shift to the blue relative to the benzene peak, whereas the substitution of a methyl group causes a red shift.