

DEVELOPMENT OF A QCL-BASED SPECTROMETER FOR SPECTROSCOPIC ANALYSIS OF BIOGENIC VOLATILE ORGANIC COMPOUNDS

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Biogenic volatile organic compounds (BVOCs) are naturally occurring molecules that are emitted into the atmosphere by plants. BVOCs have an important role in atmospheric chemistry as they react readily with ozone, hydroxyl radicals, and nitric oxides to form aerosols and pollutants such as ozone in the troposphere. We are developing an IR spectrometer with the aim of measuring spectra of atmospheric samples of BVOCs to determine their concentrations. Using an external cavity quantum cascade laser (EC-QCL), we have acquired IR spectra of isoprene (C_5H_8) near 993 cm^{-1} . Isoprene represents an ideal target, as it is the simplest and most abundant BVOC. IR spectra of standard samples of isoprene were acquired in order to determine the detection limit of the spectrometer. We have also been working to improve the capabilities of the spectrometer by implementing wavelength modulation spectroscopy and increasing the path length through our samples by using a multipass cell. In this talk, we will present data from our initial measurements of the standard isoprene samples using a simple direct absorption setup as well as measurements using the improved spectrometer.