SUPERCONTINUUM BASED BROADBAND CAVITY ENHANCED ABSORPTION SPECTROSCOPY

PAUL S. JOHNSTON and KEVIN K. LEHMANN, *Department of Chemistry, University of Virginia, McCormick Rd., P.O. Box 400319, Charlottesville VA, 22904-4319*.

The multiplex advantage of current cavity enhanced spectrometers is limited by the high reflectivity bandwidth of the mirrors used to construct the enhancement cavity. We report the design and construction of a new spectrometer that circumvents this limitation by utilizing Brewster's angle prism retroreflectors. This is combined with a supercontinuum source generated by pumping a highly nonlinear photonic crystal fiber, yielding a spectral window ranging from 500 nm to 1750 nm. We have demonstrated a ringdown time of 12.2 $\mu$s at 700 nm. The cavity enhanced spectrum of the A band of atmospheric oxygen was observed by dispersing the transmission of the cavity with a 1 m spectrograph combined with a CCD camera for detection. We have recently obtained a new set of prisms made of Suprasil 3001, low $OH^-$ fused silica, that have a reported ringdown time of 63.5 $\mu$s at 1578 nm.