

MID-INFRARED SPECTROSCOPY OF TRANSIENT SPECIES USING A CHIP-SCALE MID-INFRARED OPTICAL FREQUENCY COMB

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Optical frequency combs have become a promising tool for sensitive and broadband spectroscopy. They are especially attractive for investigations of the structure and reactivity of transient species, where multiplexed detection provides information regarding reactive intermediates and product branching ratios. However, the cost and complexity of conventional frequency combs has inhibited their widespread use in chemistry laboratories. Frequency combs generated using semiconductor lasers, such as quantum or interband cascade lasers, offer an alternative that is compact and less technically demanding. We have employed interband cascade lasers, which provide coverage in the CH stretching region, to monitor reactions initiated by pulsed-laser photolysis using Vernier spectroscopy. The reaction between 1-hydroxyethyl radical and oxygen forms acetaldehyde, and is an ideal test-case for the newly constructed instrument. We will discuss the performance characteristics and applications of this new and promising technique.