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Mid-infrared QEPAS for TATP detection

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Recent developments of external cavity quantum cascade lasers (EC-QC lasers) enable new applications in laser spectroscopy of gaseous species in the mid infrared spectral region. We report the application of quartz enhanced photo acoustic spectroscopy (QEPAS) with a widely tunable EC-QC laser as an excitation source for chemical sensing of different species. A pulsed EC-QC laser operating at around 8µm is used for the detection of the explosive TATP which is a broad band absorber. The detection limit of our present setup is ~ 1ppm TATP at atmospheric pressure. Commercial cw EC-QC lasers operating at room temperature became recently available. Such a EC-QC laser for high resolution spectroscopy of ammonia as well as for TATP detection at 10µm was used. Both, the sensing of broad band absorbers and the detection of small molecules with narrow linewidths down to 0.01 cm-1 are possible.