

First QEPAS Measurements on Solid Samples

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Quartz-Enhanced Photoacoustic Spectroscopy (QEPAS) is well known for high-performance analysis of gaseous samples. In this technique, the sound wave is detected by a quartz tuning fork (QTF) which enables particularly high specificity with respect to the excitation frequency. We developed the first implementation of QEPAS for the investigation of solid samples. Periodic heating of the sample is excited by pulsed light from a quantum cascade laser (QCL) in the infrared region. Additionally, an acoustic resonator is considered in order to amplify the sound wave generated by the periodic temperature change at the sample boundary. With this new photoacoustic (PA) setup, thermophysical properties of solid and semi-solid samples or aqueous solutions can be investigated. A quantitative analysis of the composition can be performed as well. Optimizations in terms of optical alignment, physical environmental conditions and signal processing are necessary to increase sensitivity.