## **Physical Property Measurement using Acoustic Levitation**

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Acoustic levitation provides the possibility of keeping small material samples in suspension with sound. High frequency sound waves, emitted by an ultrasonic transducer and reflected by an adjustable reflector, interfere creating a standing sound field. This is characterized by areas of high energy density alternating with areas of low energy density. Small samples can be held contactless in the areas of low energy density. The levitated sample offers the possibility to be analyzed using different methods. In the presented investigation, shape oscillations of levitated, liquid drops are excited by amplitude modulation of the sound field. After cessation of the modulation signal, the drop performs a damped oscillation. Surface tension of the liquid determines the frequency of the shape oscillation, whereas viscosity determines the decay time. To develop a method for the simultaneous determination of surface tension and viscosity from drop shape oscillations, measurements with different liquids with viscosities from 2 mPa·s to 30 mPa·s are carried out under ambient pressure. Influences of the sound field or the amplitude of oscillation on the results are analyzed. After validating the method under ambient pressure, interfacial tension and viscosity of squalane saturated with CO<sub>2</sub> under pressure are measured. Interfacial tension and viscosity are determined at temperatures of 313 K, 333 K, and 353 K and pressures between 0.1 MPa and 10.1 MPa and compared to literature data. Acoustic levitation emerges as a promising method for physical property measurement under both ambient and high pressure, since it allows simultaneous interfacial tension and viscosity determination using only microliter samples.