Experimental Density Determinations for Industrial Applications

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The Laboratory for Thermophysical Properties (LTP) is a global service provider for the experimental determination of phase equilibria (e.g., vapor pressures, critical data, VLE, VLLE, or SLE), volumetric data like densities or density changes, caloric data such as enthalpy changes and heat capacities, and transport properties like viscosities, thermal conductivity, or surface tension. Density is a very elementary and important property in chemical engineering. Typical projects from chemical and petrochemical industry or chemical engineering companies often come along with challenging chemicals or conditions like high pressures or temperatures. From new alternative refrigerants, race fuels, hydraulic oils over multi component gas mixtures, e.g., with hydrogen sulfide or highly corrosive acids to brine slurries or highly viscous crude oils. Various experimental techniques from a simple scaled glass flask, via constant or variable volume vessels and vibrating tube densimeters to a magnetic suspension balance are useful for different tasks depending on the measurement conditions, properties of the sample, and required accuracy. With the presented techniques and set-ups, broad ranges of temperature (from about 200 to 670 K) and pressure (up to 100 MPa) for liquid, vapor, critical, and supercritical density determinations for various sample species can be covered.