

2006 APS March Meeting
Monday–Friday, March 13–17, 2006; Baltimore, MD

Session K21: Colloids V

2:30 PM–5:18 PM, Tuesday, March 14, 2006

Baltimore Convention Center - 318

Sponsoring Unit: DFD

Chair: D. Grier, New York University

Abstract: K21.00011 : Applications of Quartz Tuning Forks to Liquid Property Measurements

4:30 PM–4:42 PM

[Preview Abstract](#)

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Sensor technology for fluid samples often measures a single physical parameter per sensor and for many applications this is sufficient. In some cases however, characterization of the state or condition of a fluid can be improved through the simultaneous measurement of multiple physical parameters. We will discuss our work in the application of flexural mechanical resonators such as quartz tuning forks to the characterization of fluids. We have previously shown that if a tuning fork resonator is immersed in a fluid, the changes in resonator response can be used to determine physical properties of the fluid. We will describe the development of a measurement system based on a tuning fork resonator, the associated electronics and analysis software. This system can provide simultaneous measurement of liquid properties such as viscosity, density, dielectric constant and ac conductivity. We have applied the tuning fork sensor to the characterization of fluids over a range of temperatures and conditions. Simultaneous measurement of viscosity, density and dielectric constant can provide information about the state or condition of the fluid. For example, for motor oils, clear differences in the measured parameters are observed between fresh and used oils and may be correlated to the oil condition.