

AGENDA

Mezger Applied Rheology Seminar

8:45 Registration and welcome

9:00 Part 1: Rheology - viscosity and flow behavior

- Introduction to rheology and viscoelastic behavior
- Simple viscosity test methods: Flow cups, capillary and falling ball viscometers; rotational tests, measuring systems, relative and absolute
- Definition of terms: Shear stress, shear rate, shear viscosity
- Newton's Law

10:00 Coffee break

10:15 Part 1: Rheology – viscosity and flow behavior continued

- Rotational (steady shear) tests: Controlled shear rate (CSR); controlled shear stress (CSS); shear load dependent flow behavior: Ideal viscosity behavior (Newtonian fluid); shear thinning (pseudoplastic fluid); zero shear viscosity; shear thickening (dilatant fluid)

11:15 Coffee break

11:30 Part 1: Rheology - viscosity and flow behavior continued

- Time dependent flow behavior: Structural breakdown and recovery (thixotropy); gelation, hardening, curing
- Temperature dependent flow behavior: Heating, melting, curing, hardening, curing, crystallization

Part 2: Rheology – elasticity and viscoelastic behavior

- Introduction viscoelastic behavior

12:30 Lunch (provided)

13:00 Part 2: Rheology – elasticity and viscoelastic behavior

- Definition of terms: (shear) strain or deformation, shear modulus, elasticity law, strain rate (shear rate); Ideally elastic deformation behavior
- Introduction to oscillatory tests, definition of terms: Storage modulus and loss modulus, loss or damping factor, vector diagram
- Oscillatory tests and applications using examples from industry

14:00 Coffee break

14:15 Part 2: Rheology – elasticity and viscoelastic behavior

- Amplitude sweeps: linear viscoelastic (LVE) range, yield point, flow point
- Frequency sweeps: unlinked polymers and curve crossover point, complex viscosity, zero-shear viscosity, Maxwell behavior; crosslinked polymers; dispersions and gels: storage stability

15:15 Coffee break

15:30 Part 2: Rheology – elasticity and viscoelastic behavior

- Time-dependent viscoelastic behavior: structural break and recovery, thixotropic behavior; gel formation, hardening, curing
- Temperature-dependent viscoelastic behavior (DMTA): melting, glass transition; cooling, crystallization; gel formation, sol / gel transition; hardening, curing
- Testing solid torsion bars; extensional viscosity

16:00 End of Mezger seminar