

Rheology and Surfactants: Chemistry, Theory, and Application

DIRECTED BY

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ACCREDITED
COURSE

Course Topics Include:

- Definition and the Essential Elements of Rheology
- The Influence of Stress, Temperature, and Time
- Rheological Behavior via Flow and Viscosity Curves
- Interatomic Bonding and Intermolecular Attraction
- Surface Tension, Wetting, and Dispersion
- Foam Stabilization and De-Stabilization
- Measuring Methods of Flow Behavior and Surface Tension

about the course

Developing products that can properly wet surfaces, disperse pigments, emulsify key components, or generate or destabilize foam is challenging due to the high surface tension of water. Understanding how materials are affected by applied stress forces and their flow behavior is crucial for formulators to develop products with optimal outcomes in terms of production, storage, packaging, and application.

To address these challenges, we offer a six-hour accredited course on Rheology and Surfactants (Chemistry, Theory, and Application). The course covers the fundamental principles of viscosity and surface tension, providing an in-depth understanding of the chemistry and mechanism of rheological additives and surface-active agents. Additionally, the course covers product types, deformation forces, flow behavior profiles, surface activity, measuring methods, and a review of interatomic bonding and intermolecular attraction, which will help explain how these important specialty additives and agents perform in real-world applications.

By taking this course, participants will gain essential insights into the relationship between rheology and surfactants and their effects on product development. They will also identify how to select and apply the appropriate additives and agents for optimal performance in their products. This knowledge will enable formulators to create high-quality products that meet customer needs and outperform competitors in the marketplace.

who should attend

This course is designed for research and development as well as business area personnel engaged in a wide array of industries including architectural paints, industrial coatings, printing inks, adhesives, pharmaceuticals, agrochemicals, personal care products and cosmetics. It is targeted for formulation chemists as well as marketing, sales, and customer service personnel.

learning objectives

Upon completion of this course, you will be able to:

- Describe the Essential Elements of Rheology
- Explain the Effects of Deformation Forces, Temperature, and Time on Flow Behavior
- Recognize Flow and Viscosity Profiles
- Outline the Fundamentals of Surface Tension
- Appreciate the Role of Surfactants in Wetting, Dispersion, and Emulsification
- Identify the Chemistry and Mechanism of Rheological Additives and Surface-Active Agents
- Describe Measuring Methods for Viscosity and Surface Tension

course outline

Review of Learning Objectives

Introduction to Rheology, Deformation Forces and Viscosity

Introduction and definition of Rheology. The essential elements of rheology including chemical structure, morphology, outside forces, and environmental factors. Rheological differences between liquids and solids and the viscoelastic nature of materials. An introduction to viscosity. A review of the forces that impact a materials rheology. A deeper understanding of viscosity with respect to shear stress, shear rate, and units of measurement.

Flow Profiles and Chemistry

A review of the various rheological flow profiles including Newtonian, pseudoplasticity, dilatancy, and thixotropy. Examples and demonstration of each type. The importance of thixotropy; using an industrial coating formulation as an example. A review of the various rheological agents with respect to type (associative and non-associative), chemistry, mechanism and function

Introduction to Surfactants, Chemical Bonding and Surface Activity

Introduction and definition of Surfactants

The various types and chemical structures of surface-active agents in use today. A review of inter-atomic and inter-molecular bonding including covalent, ionic, Van der Waal forces, and hydrogen bonding that impact surface tension. The principles of various surface activities including surface tension, surface pressure, wetting, surface area, surface transport, and micelle formation.

Foam Stabilization and De-Stabilization, Dispersion and Surface Tension Measuring Methods

A clear understanding how foam is generated, stabilized, and de-stabilized both on the surface and in the bulk as air entrainment. A review of surfactant technology as an aid to the dispersion of solid particles - pigments, extenders, fillers, and specialty additives. The course will conclude with a review of surface tension measuring techniques including static and dynamic surface tension instrumentation.

Assessment Opportunity

course instructor

Sam Morell is a Chemical Engineering graduate of New York University and founder of samMorell.com. With over 40 years in the Chemicals industry, his experience includes both technical and marketing positions at Rohm and Haas, BASF, and Air Products and Chemicals. Mr. Morell has authored numerous technical articles on additives, pigments, and resins in various publications including PCI Magazine, Modern Paint and Coatings, The American Ink Maker, and Adhesives Age. He has been invited by various domestic and international industry symposiums, as well as Fortune 500 companies, to present both technical papers and educational courses. These include The American Coatings Show, The Waterborne Symposium, The European Coatings Show, and Coatings Trends and Technologies.

Accreditations



International Accreditors for Continuing Education and Training (IACET)

Cobblestone has been approved as a CEU Accreditor by IACET and awards CEUs for participation in qualified courses. Cobblestone has demonstrated that it complies with the ANSI/IACET Standards and is authorized to offer IACET CEUs for its programs. CEUs will be awarded for participation in Cobblestone's courses at the rate of .1 CEU per contact hour upon successful completion of the entire course and 70% accuracy in the required Learners' Assessment. A minimum score of 80% is required for all courses within a Cobblestone Certification Program. This course offers a total of 6 contact hours, or .6 CEUs. For further information, visit www.iacet.org