

Introduction to Chemical EOR Laboratory Practices

Basic Course Introducing Chemical EOR Lab Skills

The laboratory training course is an excellent way for individuals to understand the foundation of chemical EOR methods: laboratory studies. UEORS's skilled lab personnel sets the company apart from competitors and a week of observation, hands-on training, and formal learning with them is a unique opportunity for clients. The course covers four general areas: Lab Safety, Microemulsion Phase Behavior, Polymer Solutions, and Core Flooding. Clients have the option of focusing on one or more of these areas in more detail if requested. The course can be customized and tailored to the requirements of the client.

Target Audience

This course will benefit individuals requiring a basic understanding of the laboratory experiments and procedures necessary in designing a chemical EOR (CEOR) flood. Participants may include engineers who want to understand experiments completed by UEOR, laboratory technicians who need to reproduce UEOR's procedures and employees of service companies who need basic techniques of chemical product testing, quality control and analysis during implementation of a CEOR flood. No specific background is required for this course.

Skills Learned in Course

Participants in the course will:

- Learn essential lab safety procedures
- Study the chemistry of various CEOR surfactants
- Understand basic microemulsion phase behavior experiments
- Interpret microemulsion phase behavior results
- Learn to make and evaluate lab-scale polymer solutions
- Analyze aqueous stability experiments
- Learn basic core flood procedures
- Train in coreflood effluent analysis procedures
- Learn to interpret coreflood results
- Acquire CEOR terminology

Course Description

All participants in the laboratory training course will start with mandatory UEORS laboratory safety training before moving to the laboratory environment. Once in the lab, they will work closely with experienced UEORS staff to gain an understanding of CEOR lab procedures. Parts of the training course can be hands-on (such as phase behavior pipetting or polymer solution mixing) to help solidify the concepts being learned. Other aspects of the course will be necessarily observation-based due to timing, experimental complexity and safety constraints (i.e. certain core flooding procedures).

If needed, the course can include classroom time to help participants understand surfactant / polymer chemistry and properties of porous media. This course can be partially customized to the client's specific needs; for example clients interested in polymer flooding can receive detailed training on polymers and associated experiments. Participants may also request more in-depth training on specific topics or experiments, however longer or shorter training courses may be necessary. The experience level of the participants may also have an effect on the course content and duration. This course must be scheduled well in advance to coordinate with other laboratory efforts.

Course Content

- Lab safety training
 - PPE
 - MSDS
 - Laboratory hazards
 - UEORS safety protocols
- Polymer techniques
 - Overview of CEOR polymers
 - Stock solution preparation
 - Filtration ratio measurements
 - Viscosity measurements
 - Utilizing and storing polymer solutions
- Overview of surfactant chemistry
 - CEOR surfactant structures
 - Stability
 - Co-solvent overview

- Phase behavior techniques
 - Synthetic brine preparation
 - Microemulsion phase behavior pipettes
 - Identifying equilibrium
 - Interpretation of observations
 - Solubilization ratio plots (interfacial tension)
- Core flooding
 - Overview
 - Procedures
 - Preparation of chemicals
 - Monitoring / troubleshooting
 - Effluent analysis
 - Results / interpretation