



TRAINING PROGRAM



Chromatographic Methods And Their Application

Introduction:

Scientists have a need to know the composition, identity and quantity of the samples with which they are deal. Consequently, the Chromatography which is the separation of an analytic from a complicated mixture of similar constituents for qualitative or quantitative identification is a very important development technique of chemical and physical analysis. This course discuss one of most important methods of instrumental analysis in the different applications. There is no chemical industrial field has no need to chromatographic analysis.

Who Should Attend?

The course is of interest for any person working in any analytical laboratory. Laboratory staff, Chemists, supervisors and technicians.

Methodology:

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include;

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

Certificate:

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration

Course Objectives:

The quality of analysis depend more on the quality of the operator than that of the instrument, so this course will help laboratory staff to understand meaning and principals of chromatographic methods and their applications.

Course Outline:

(1) Introduction to chromatography

- Classification of separation process
- History of chromatography
- Types of Chromatography

(2) Fundamentals of chromatography

- Definitions
- Basic System Design
- Concept of Polarity
- Properties of Separation
- Physiochemical Processes of Separation
- Adsorption
- Partition
- Ion Exchange

- Size Exclusion
- Planar Chromatography

1- Paper Chromatography

2- Thin Layer Chromatography

- Overall Process
- Sample Preparation
- Storage and Preparation of Stationary Phase
- Sample Application
- Development of Chromatogram
- Detection and Visualization
- Qualitative Identification
- Quantitative Analysis
- Application
- Advantages and Disadvantages

(3) Gas Chromatography

- Objectives
- Definitions
- Introduction
- Principals
- Mobile and Stationary Phase
- Instrumentation
- Injection Methods and Derivatization Techniques
- Columns
- Detectors
- Recorders & Data Acquisition
- Maintenance and Quality Assurance

(4) Liquid chromatography

- Objectives
- Definitions
- Introduction
- Principals
- Component Parts

- ❖ Mobile Phase Reservoir
- ❖ Pumps
- ❖ Injectors
- ❖ Columns
- ❖ Detectors
- Recorders & Data Acquisition
- Systems
- Advantages and Disadvantages
- Maintenance and Quality Assurance

(5) SUPERCRITICAL FLUIDS

- Properties of Supercritical Fluids and their mixtures
 - ❖ Solvent Strength of pure Fluids
 - ❖ Phase behavior
 - ❖ Classifications of Phase Boundaries for binary Systems
 - ❖ Polymers and Supercritical Fluids
 - ❖ Dispersions in Supercritical Fluids
- Molecular Modeling of Phase behavior
- Experimental Techniques
- Process and Applications

(6) HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY

- HPLC-Stationary Phase
- HPLC-Mobile Phase
- Ion-pair and Ion-Suppression
- Injectors
- Columns
- Detectors
- Recorders & Data Acquisition

(7) Out let manipulation

- Chromatogram
- The Effect of Relative Migration Rates and Band Broadening on Resolution
- Migration Rates of Solutes
 - ❖ Partition Ratios in Chromatography
 - ❖ Retention Time
 - ❖ Relationship Between Retention Time and Partition Ratio

- ❖ The Rate of Solute Migration
- ❖ Selectivity Factor
- The Efficiency of Columns
 - ❖ The rate Theory
 - ❖ Quantitative Definition of Columns Efficiency
 - ❖ Plate and Plate Height
 - ❖ Kinetic Variables Affecting Band Broadening
 - ❖ Theory of Band Broadening
- The Mass-transfer Coefficient
- Optimization of Column Performances
- General Elution Problems

(8) Application in hydrocarbon industry

(9) Routine Maintenance