Spectros Associates Proudly Presents the One Day Short Course

Infrared Spectral Interpretation I

Instructor: Dr. Brian C. Smith

A 1 day overview of infrared interpretation. You will learn how to integrate the peak position, height, and width information in a spectrum to successfully determine unknown molecular structures and to perform identities properly. The four ways of attacking mixture spectra are discussed, then a 10-step method to interpret spectra is presented. The diagnostic infrared bands of many economically important molecules including hydrocarbons, alcohols, ketones, esters, and polymers are presented. Attendees interpret many unknown spectra in class with the help of the instructor. The course is drawn from the 260 page textbook *Infrared Spectral Interpretation* written by Dr. Smith and published by CRC Press.

I. The Fundamentals of Infrared Interpretation

- **A. The Properties of Light**
- **B. The Meaning of Peak Positions, Heights, and Widths**
- **C. A Systematic Approach to Spectral Interpretation**
  - **1. Dealing with Mixtures**
  - **2. Performing Identities Properly**
  - **3. A Systematic 10-Step Approach to Infrared Interpretation**

II. Functional Group Analysis of Hydrocarbons

- **A. Alkanes: C-H Stretching and Bending Vibrations**
  - **1. Straight Chain Alkanes**
  - **2. Estimating Hydrocarbon Chain Length from IR Spectra**
- **B. Aromatic Hydrocarbons**
  - **1. Mono-Substituted Benzene Rings**
  - **2. Distinguishing Ortho, Meta, and Para Isomers**

III. Alcohols & Phenols

- **A. Differentiating Primary, Secondary, and Tertiary Alcohols**
- **B. Phenols**
- **C. Distinguishing Alcohols from Water**

IV. The Carbonyl (C=O) Functional Group

- **A. Intro. to Carbonyl Spectra**
- **B. Ketones**
- **C. Esters: The Rule of 3**
- **D. Summary**

V. Introduction to the Infrared Spectra of Polymers

- **A. Low and High Density Polyethylene**
- **B. Polypropylene**
- **C. Polystyrene**
- **D. Polyethylene Terephthalate (PET)**

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