NEW BOOKS

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Gas Chromatography of Coating Materials, J.K. Haken, Editor, (Marcel Dekker, New York, N.Y., 1974, $29.75).

Chapter 1 lists the literature sources for gas chromatography. Much of the material discussed in this book was drawn from those sources which include journals, textbooks, symposia proceedings, abstracts, bibliographies, review articles, and trade literature.

Chapter 2 goes into the basics of gas chromatography. The author explains how experimental variables affect column performance and shows how to claculate column dead volume, specific retention volume, Kovats retention index, and other methods for expressing retention data. He stresses the need for a standard way of reporting data to make it useful to others working in the field and discusses steps taken to date to accomplish this end.

Chapters 3 and 4 are concerned with problems that relate to identifying and determining the quantities of components in coating materials placed on gas chromatography. The importance of standardizing stationary phases so that reproducible data can be obtained is discussed. The author describes procedures for relating retention behavior to the structure of the molecules under study. Mixtures are characterized by chemical reactions commonly used in organic analysis either before or after chromatography is performed. Many literature references are cited that give details of the suggested procedures. He describes how the newer methods in instrumental analysis, like mass spectroscopy and rapid scan IR spectroscopy, can be used in conjunction with gas chromatography to identify components in mixtures.

Chapter 5 takes up an important area of interest to coatings people: the analysis of solvents and their mixtures. Again, as in other chapters, the material presented is documented by numerous literature references. Problems involved in solvent analysis, like separation of solvents from other coating components, and the separation of the separated solvent mixtures are discussed adequately. The author recognizes the impact antipollution legislation is having on both the petroleum and coatings industries and directs a good portion of his discussion on the separation of solvents, particularly aromatic solvents, affected by Rule 66.

Chapter 6 discusses the separation of plasticizers from coatings and resins, such as nitrocellulose, vinyl and acrylic lacquers, and polyvinyl chloride, and the characterization of these plasticizers by gas chromatography.

Chapters 7 and 8 contain information of interest to people working with vinyl polymers. The first chapter deals with methods for determining the amount of residual monomer in vinyl polymers. Samples can be analyzed by direct injection of the polymer solutions or latex onto the gas chromatography or by separation of monomer from the polymer by precipitation or extraction procedures followed by gas chromatography analyses. The next chapter describes gas chromatography methods for determining monomer purity. Details are given for acrylate and methacrylate esters, acrylonitrile, divinyl benzene, styrene and α-methyl styrene, vinyl chloride, vinyl esters, and vinyl ethers.

Chapter 9 deals with a timely subject, the analysis of aerosol propellants in coatings, while Chapter 10 describes procedures for the analysis of alkyd resins and linear polyesters. Resins are cleaved by acid hydrolysis, saponification, aminolysis, or transesterification prior to gas chromatography analysis. Other coating materials (discussed in Chapters 11, 12, and 14) may be degraded prior to analysis by pyrolysis, cleavage with hydriodic and parperiodic acids, or by methods described above. The list of resins analyzed is impressive and includes polyvinyl esters, epoxies, polyurethanes, polyethers, polyamides, phenol-formaldehyde resins, polysiloxanes, cellulose and starch derivatives, and vegetable oils and their fatty acids.

Chapter 13 discusses like separation and analysis of additives to polymer and coating systems, like antioxidants and UV absorbers, driers, promoters, and preservatives. The final chapter reports on the use of gas chromatography to examine coating films and solid polymers for residual solvent, film permeability, and degradation products with aging.

All in all, this book should serve the needs of analytical chemists and technicians in the coatings industry, as well as consulting laboratories concerned with the investigation of these materials.

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