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The Chemist's Companion: A Handbook Of Practical Data, Techniques, And References



Synopsis

Here in one source is a wide variety of practical, everyday information often required by chemists but seldom found together, if at all, in the standard handbooks, data collections, manuals, and other usual sources. Discussing physical, chemical, and mechanical properties of substances and systems, the authors answer such questions as: How do I test for and destroy peroxides in different solvents and what is the best way to purify such solvents? What are the structure, physical properties, and recent references to the use of common-name solvents and solvent aids such as the "Skellysolves," "Cellosolves," "Crownanes," and "Glymes"? What is the utility of a particular molecular sieve, or permeation gel, or epoxy cement, or liquid crystal, and where do I buy them and find references to their application? The book is divided into nine chapters and covers properties of atoms and molecules, spectroscopy, photochemistry, chromatography, kinetics and thermodynamics, various experimental techniques, and mathematical and numerical information, including the definitions, values, and usage rules of the newly adopted International System of Units (SI Units). A section on statistical treatment of data which provides an actual least-squares computer program is also included. In the spectroscopy chapter, very extensive and up-to-date collections of spectral correlation data are presented for ir, uv-vis, optical rotation, nmr, and mass spectra, along with data on esr and nqr spectroscopy. Also included is a variety of hard-to-classify but frequently sought information, such as names and addresses of microanalysis companies and chemistry publishers, descriptions and commercial sources of atomic and molecular models, and safety data for hazardous chemicals. More than 500 key references are also included, most of which are recent. There are important hints and definitions associated with the art as well as the state of the art for the appropriate subjects. Also found throughout the book are about 250 suppliers and directions for obtaining special booklets or other material. Containing a wealth of useful information, The Chemist's Companion will be an indispensable guide for students and professional chemists in nearly all the chemical disciplines. In addition, it will provide for the teacher and student an unusual adjunct for use in a broad cross-section of chemistry courses.

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The Chemist's Companion A Handbook of Practical Data, Techniques, and References
Arnold J. Gordon and Richard A. Ford Contents Properties of Molecular Systems Properties of Solvents and Common Liquids • Azeotropic Data • Empirical Boiling Point-Pressure Relationships • Properties of Selected Gases • Properties of Representative Fused Salt Systems • Structure and Properties of Naturally Occurring α -Amino Acids • Properties and Applications of Liquid Crystals • Prototropic Tautomerism • Acids and Bases • Properties of Atoms and Bonds Properties of the Elements • Table of Isotopes • Selected Bond Lengths • Effective van der Waals Radii • Bond Angles and Hybridization • Selected Bond Strengths • Force Constants • Torsion and Inversion Barriers • Bond and Group Dipole Moments • Aromaticity • Kinetics and Energetics Activation Parameters and Kinetics of Selected Reactions • Linear Free Energy Relationships • Conformational Free Energy Values • Free Energy-Composition Chart • Spectroscopy The Electromagnetic Spectrum • Solvents and Other Media for Spectral Measurements • Optical Materials for Spectroscopy and Photochemistry • Vibration Spectra • Electronic Absorption and Emission Spectra: Uv and Vis • Optical Activity and Optical Rotation • Mass Spectrometry • Nuclear Magnetic Resonance Spectroscopy • Electron Spin Resonance Spectroscopy • Nuclear Quadrupole Resonance Spectroscopy • Bibliography of Spectral Data Compilations • Photochemistry Electronic Energy State Diagram • Excited State Energy Transfer: Sensitizers and Quenchers • Photochemistry Light Sources and Equipment • Chemical Actinometry: Quantum Yield • Suppliers • References • Chromatography Fundamental Types of Chromatography and Basic Definitions • Adsorption Chromatography • Paper Chromatography • Column and Thin Layer Partition Chromatography • Ion-Exchange Chromatography • Gel Filtration and Gel Permeation Chromatography • Automated Liquid Chromatography • Electrophoresis • Vapor Phase Chromatography • Chromatography Supply Directory • References • Experimental Techniques Properties of Laboratory Materials • Standard Glassware Cleaning Solutions • Purification of Common Solvents • Detection of Peroxides and Their Removal • Chemical Methods for Deoxygenating Gases and Liquids • Simple Chemical Methods for Detecting Specific Gases • Simple Preparations of Some Dry Gases • Common Solvents for Crystallization

• Solvents for Extraction of Aqueous Solutions • Drying Agents • Solvents and Baths for Heating and Cooling • Molecular Weight Determination • Mathematical and Numerical Information Approved International Units System and General Constants • Useful Conversion Factors • Wavelength-Wavenumber Conversion Table • Multiples of Element and Group Weights • Molecular Symmetry: Definitions and Common Systems • Character Tables for Common Symmetry Groups • Computer Programs • Statistical Treatment of Data • Miscellaneous Important Chemistry Reference Sources: A Bibliography • Atomic and Molecular Models • Addresses of Publishers that Deal With Chemistry • Combustion Microanalysis and Other Custom Analytical Services • Hazards of Common Chemicals • Suppliers Index Subject Index

It should be made clear that this book is geared towards synthetic (particularly organic) chemists. As such, much of the information in this book like drying agents, cleaning mixtures, cooling baths, silica/alumina chromatography are still very much applicable for the practicing synthetic chemist. Other highlights of this book include a good section on spectroscopy (IR frequencies, NMR shifts and coupling constants) as well as atomic and molecular properties (like bond lengths, pKa's, etc.) That said, this book is old. One of the charts includes a melting point for the "polywater" "discovered" by Soviet scientists in the 70s, which has since become a textbook example of pathological science. It would be nice for this book to be updated.

I bought this book several years ago, when I was still a lab tech. Now that I have my own lab and do my own research. I still have this very valuable tome by my side. The NMR data and the other Spectroscopy and Chromatography data is not to be found anywhere else. Very valuable little book. We use it quite frequently in the lab along with the CRC manuals and Lange's handbook of Chemistry. I would not trade this for the world.

Just fine

Apparently the edition I ordered is from the 1960's... that wasn't clearly stated in the description, or maybe I just missed it, but 1960's information has VERY limited utility for me. Not to mention the entire thing appears to have been typed with a typewriter, with no graphics whatsoever, so in addition to being useless it's also ugly. If you want this book MAKE SURE TO CHECK THAT IT'S A NEWER EDITION or you will be sorry.

"The Chemist Companion" is a must for the laboratory scientist. It is an invaluable resource for everyday questions like recipes for solvent mixtures, cooling baths, cleaning baths, etc. The index is straightforward and easy to use. Much of the information is in easy-to-read tables. Information is referenced and clearly written. A valuable resource!

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