

CRC

HANDBOOK
of
CHEMISTRY
and
PHYSICS

DAVID R. LIDE
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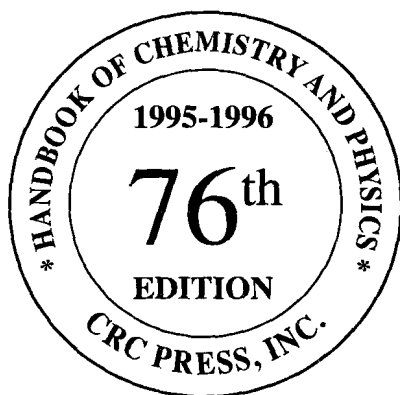
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of
Chemistry and Physics

76th Edition

CRC Handbook of Chemistry and Physics

A Ready-Reference Book of Chemical and Physical Data



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To Mary, David, and Grace Lide

PREFACE

76th Edition

The highlight of the 76th Edition of the *Handbook of Chemistry and Physics* is a completely revised table of "Physical Constants of Inorganic Compounds". Judging from user inquiries, this table and its companion table for organic compounds are the most widely used parts of the *Handbook*. In addition to incorporating updated values of the physical constants, the table includes new information such as Chemical Abstracts Service Registry Numbers and pointers to other tables in the *Handbook* where additional properties are covered. The compounds in the table have been selected to include the most important inorganic substances encountered in research, industry, and environmental studies. An effort has been made to include inorganic compounds that are important in modern materials science. The table appears in a more readable format, and indexes by synonym and CAS Registry Number are given to facilitate location of compounds.

Several other parts of the *Handbook* have also been expanded or revised in this edition. The information on vapor pressure is enhanced by addition of a table covering values for less volatile substances at elevated temperatures. The table on solvents has been updated and expanded to include 200 common laboratory solvents. A new listing of carcinogenic chemicals, derived from the 1994 report of the National Toxicology Program, is given. On the physics side, the "Table of the Isotopes" and the "Summary Table of Particle Properties" have been completely updated, as have the tables on "Electron Affinities" and "Atomic and Molecular Polarizabilities". New tables appear on "Techniques for Materials Characterization", "Nonlinear Optical Properties", and "Organic Superconductors", and the tables on "High Temperature Superconductors" and "Physical and Optical Properties of Minerals" have been updated. Finally, several older tables have been converted to SI units and reset in a more readable format.

In order to make room for new material in the last few editions, some of the older tables have been dropped. The Editor will appreciate comments on the removal of these tables; if there is sufficient interest, an effort will be made to restore them in abbreviated form.

Suggestions and criticisms from users are very important to the success of this book. Suggestions on new topics of current interest (and on older tables whose usefulness is questionable) are particularly helpful. Address all comments to Editor, *Handbook of Chemistry and Physics*, CRC Press, Inc., 2000 Corporate Blvd. N.W., Boca Raton, FL 33431.

The *Handbook of Chemistry and Physics* is dependent on the efforts of many contributors throughout the world. The list of current contributors follows this Preface. Dr. H.P.R. Frederikse, Associate Editor, has made a major contribution during the last few years in expanding and improving the tables in solid state physics and materials science. I am indebted to Dr. S.L. Phillips and Dr. D.L. Perry for sending me information in advance from their forthcoming CRC Press publication *Handbook of Inorganic Compounds*, which was very helpful in planning the new inorganic table in this edition. I should finally like to express my gratitude to those at CRC Press who are responsible for the production of the *Handbook of Chemistry and Physics*, especially Paul Gottehrer, Barbara Caras, and James Brody. It is a great pleasure to work with them.

David R. Lide
February 10, 1995

Note on the Ordering of Chemical Compounds: The decision on the order in which to list chemical compounds in a table is always difficult. An alphabetical list by name has the disadvantage that several different synonyms are often in common use, with the result that a reader may conclude incorrectly that a compound is not present if he looks it up under the wrong name. Listing by line formula is satisfactory for simple inorganic compounds, but is cumbersome for organics. A listing by molecular formula is attractive because clear rules can be given for locating a compound, but the user may have to go to some effort to determine the molecular formula. In this book the choice is made on pragmatic grounds. The long tables, "Physical Constants of Organic Compounds" and "Physical Constants of Inorganic Compounds", are ordered by systematic name, but indexes to synonyms, formulas, and CAS Registry Numbers are provided. If the table is very short and includes only common substances, the listing is usually alphabetical by common name or formula. The remaining tables are ordered by molecular formula using a modification of the Hill convention. In this convention the molecular formula is written with C first, H second, and then all other elements in alphabetical order of their chemical symbols. For tables with organic compounds only, the sequence of entries then follows the alphabetical order of elements in the molecular formula and the number of atoms of each element, in ascending order, e.g., $\text{C}_3\text{H}_7\text{Cl}$, $\text{C}_3\text{H}_7\text{N}$, $\text{C}_3\text{H}_7\text{NO}$, $\text{C}_3\text{H}_7\text{NO}_2$, etc. In tables containing non-carbon compounds, those are listed first, followed by a separate listing of compounds that do contain carbon. This is in contrast to the strict Hill convention as followed by Chemical Abstracts Service, where the molecular formulas beginning with A and B precede the formulas

for carbon-containing compounds, while those beginning with D... Z follow. For tabular displays, as opposed to an index, it appears more convenient to the user if the non-carbon compounds are listed as a block, rather than being split by the longer list of carbon compounds.

For organic compounds, a quick way to determine the molecular formula is to use the "Physical Constants of Organic Compounds" table, which starts on Page 3-1, and its synonym index on Page 3-586.

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