Thermophysical Properties Of Chemicals And Hydrocarbons

#thermophysical properties #chemical properties #hydrocarbon properties #thermophysical data #chemical engineering properties

Explore the essential thermophysical properties of various chemicals and hydrocarbons. Understanding these crucial chemical properties and hydrocarbon properties provides vital thermophysical data for applications in chemical engineering, process design, and safety analysis, enabling precise calculations and informed decision-making across scientific and industrial sectors.

Thermophysical Properties of Chemicals and Hydrocarbons

Compiled by an expert in the field, the book provides an engineer with data they can trust. Spanning gases, liquids, and solids, all critical properties (including viscosity, thermal conductivity, and diffusion coefficient) are covered. From C1 to C100 organics and Ac to Zr inorganics, the data in this handbook is a perfect quick reference for field, lab or classroom usage. By collecting a large – but relevant – amount of information in one source, the handbook enables engineers to spend more time developing new designs and processes, and less time collecting vital properties data. This is not a theoretical treatise, but an aid to the practicing engineer in the field, on day-to-day operations and long range projects. Simplifies research and significantly reduces the amount of time spent collecting properties data Compiled by an expert in the field, the book provides an engineer with data they can trust in design, research, development and manufacturing A single, easy reference for critical temperature dependent properties for a wide range of hydrocarbons, including C1 to ClOO organics and Ac to Zr inorganics

YAWS' Thermophysical Properties of Chemicals and Hydrocarbons

Halogenated derivatives of simple hydrocarbons, like chloro-and fluoromethanes and -ethanes, are important chemicals in many industries for example as working media in organi~ Rankine cycles and refrigerating pro cesses. Although there are ecological reasons against using these substances, it is expected that they cannot be substituted in all cases. But optimizing the processes in which these substances have to be used can also contribute to minimizing the possible damage. This book summarizes the extensive experimental material available on the thermodynamic properties of 16 pure and mixed halogenated hydrocarbons, so that it can easily be used both by process and design engineers. The project was initiated by the late Professor Dr.-Ing. Eberhard Bender and Prof. Dr.-Ing.

Dr.-Ing. E.h. H.D. Baehr. We would like to express our gratitude especially to Prof. Baehr for his continuing interest and to Springer-Verlag for their patience. Besides the authors, quite a large number of students contributed to the completion of the book. Among them we are most obliged to Mr. L. Hoffmann and Mr. F. Strepp for their assistance in preparing tables, diagrams and charts. We hope that this book will prove to be useful to many colleagues, and we welcome proposals, advice, and comments.

The Yaws' Handbook of Thermodynamic Properties for Hydrocarbons and Chemicals

"Written by one of the most prolific and well-respected chemical engineers that the industry has ever produced. The Yaws Handbook of Thermodynamic Properties of Hydrocarbons and Chemicals is the most comprehensive and thorough volume ever written on the thermodynamic properties of hydrocarbons and chemicals. Carl Yaws is the world's foremost authority on vapor pressure and the properties of chemicals and he again proves it in this follow up to his important work published in 2005 by GPC Books, The Yaws' Handbook of Physical Properties of Hydrocarbons and Chemicals. Covering the thermodynamic properties of hydrocarbons and chemicals, this volume covers the spectrum, including chapters on the heat capacity and entropy of gas, the heat capacity and entropy of solids, the heat capacity of liquids, the entropy of formation and many other topics. Including more than 12,800 organic and inorganic chemicals, this resourceful work covers C1 to C100 organics and Ac to Zr inorganics collected together in one volume, making it most useful for any chemical engineer's library. Not just useful for the scientist in the lab or the student, this volume provides valuable information for the engineer working in the field. The design of heat exchangers and other equipment for heating or cooling substances to temperatures necessary in process applications requires knowledge of heat capacity, covered in the first portion of the book. The heat effects of chemical reactions are ascertained from enthalpy of formation, covered in chapter four. Other chapters cover the Helmholtz energy of formation, the Gibbs energy of formation, internal energy of formation and entropy of formation, useful in modeling and ascertaining the energy of explosions. The thermodynamic properties provided in the book are important in design, operations, research, development, environmental and safety, covering literally thousands of compounds. This coverage greatly exceeds the coverage of any other book and makes The Yaws Handbook of Thermodynamic Properties of Hydrocarbons and Chemicals a must-have for anyone working in the fields of chemical engineering, process engineering, refining and chemistry."--Publisher's website.

Thermophysical Properties of Refrigerants

Carl Yaws, a leading authority on chemical compounds in the chemical engineering field, has done it again. In Transport Properties of Chemicals and Hydrocarbons -- an essential volume for any chemist or chemical engineer’s library -- he has amassed over 7,800 organic and inorganic chemicals, and hydrocarbons. Spanning gases, liquids and solids, and covering all critical properties (including viscosity, thermal conductivity, and diffusion coefficient), this volume represents more properties on more chemicals than any single work of its kind.

Physical Properties of Hydrocarbons

An enormous amount of heretofore unavailable data has been collected and presented in this large volume. The data covers thermal, caloric and transport properties for aqueous systems: light and heavy water, their mixtures, hydrocarbons, alcohols, aqueous salts, aqueous hydrocarbons and aqueous alcohol solutions - all at high and critical parameters. Experimental data, instrumentation, data analysis and methods of measurement are given and analyzed. This book is designed for specialists in molecular physics, chemical technology and chemical and power engineering, as well as researchers, lecturers, postgraduates and students in technical colleges and universities.

Chemical Thermodynamic Properties of Hydrocarbons and Related Substances

Refineries and petrochemical engineers today are accepting more unconventional feedstocks such as heavy oil and shale, causing unique challenges on the processing side of the business. To create more reliable engineering design of process equipment for the petrochemical industry, petroleum engineers and process managers are forced to study the physical properties and compounds of these particular hydrocarbons. Instead of looking up each compound’s information, The Yaws Handbook of Physical Properties for Hydrocarbons and Chemicals, Second Edition presents an easy-to-use format with rapid access to search for the particular compound and understand all the complex calculations in one tabular

format. Understanding the composition of hydrocarbons is not easy to calculate quickly or accurately, but this must-have reference leads the engineer to better estimated properties and fractions from easily measured components. Expanded to cover more total compounds and relevant functions, The Yaws Handbook of Physical Properties for Hydrocarbons and Chemicals, Second Edition remains a necessary reference tool for every petrochemical and petroleum engineers' library. Coverage added on elements for hydrocarbons and chemicals with more than 200 real-world cases included for practicality Increased compound coverage from 41,000 to 54,000 total compounds to quickly access for everyday use New functions added such as testing boiling point temperature and new data on density and refractory index

A Computer Program for the Prediction of Viscosity and Thermal Conductivity in Hydrocarbon Mixtures

This text is a standard reference book for A Level and equivalent examinations.

Yaws Handbook of Thermodynamic Properties

Physical and thermodynamic property data for hydrocarbon and organic compounds are of special value to engineers in the chemical processing and petroleum refining industries. This book offers engineers and scientists quick access to this data by the use of tabular information.

Selected Values of Properties of Hydrocarbons

This book acts as a guide to simple models that describe some of the complex fluid dynamics, heat/mass transfer and combustion processes in droplets and sprays. Attention is focused mainly on the use of classical hydrodynamics, and a combination of kinetic and hydrodynamic models, to analyse the heating and evaporation of mono- and multi-component droplets. The models were developed for cases when small and large numbers of components are present in droplets. Some of these models are used for the prediction of time to puffing/micro-explosion of composite water/fuel droplets — processes that are widely used in combustion devices to stimulate disintegration of relatively large droplets into smaller ones. The predictions of numerical codes based on these models are validated against experimental results where possible. In most of the models, droplets are assumed to be spherical; some preliminary results of the generalisation of these models to the case of non-spherical droplets, approximating them as spheroids, are presented.

Transport Properties of Chemicals and Hydrocarbons

Written by two of the most prolific and respected chemical engineers in the world, this groundbreaking two-volume set is the "new standard" in the industry, offering engineers and students alike the most up-do-date, comprehensive, and state-of-the-art coverage of processes and best practices in the field today. This first new volume in a two-volume set explores and describes integrating new tools for engineering education and practice for better utilization of the existing knowledge on process design. Useful not only for students, professors, scientists and practitioners, especially process, chemical, mechanical and metallurgical engineers, it is also a valuable reference for other engineers, consultants, technicians and scientists concerned about various aspects of industrial design. The text can be considered as a complementary text to process design for senior and graduate students as well as a hands-on reference work or refresher for engineers at entry level. The contents of the book can also be taught in intensive workshops in the oil, gas, petrochemical, biochemical and process industries. The book provides a detailed description and hands-on experience on process design in chemical engineering, and it is an integrated text that focuses on practical design with new tools, such as Excel spreadsheets and UniSim simulation software. Written by two industry and university's most trustworthy and well-known authors, this book is the new standard in chemical, biochemical, pharmaceutical, petrochemical and petroleum refining. Covering design, analysis, simulation, integration, and, perhaps most importantly, the practical application of Microsoft Excel-UniSim software, this is the most comprehensive and up-to-date coverage of all of the latest developments in the industry. It is a must-have for any engineer or student's library.

Physical Properties of Hydrocarbons

Transport and transformation processes are key for determining how humans and other organisms are exposed to chemicals. These processes are largely controlled by the chemicals' physical-chemical

properties. This new edition of the Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals is a comprehensive series in four volumes that serves as a reference source for environmentally relevant physical-chemical property data of numerous groups of chemical substances. The handbook contains physical-chemical property data from peer-reviewed journals and other valuable sources on over 1200 chemicals of environmental concern. The handbook contains new data on the temperature dependence of selected physical-chemical properties, which allows scientists and engineers to perform better chemical assessments for climatic conditions outside the 20–25-degree range for which property values are generally reported. This second edition of the Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals is an essential reference for university libraries, regulatory agencies, consultants, and industry professionals, particularly those concerned with chemical synthesis, emissions, fate, persistence, long-range transport, bioaccumulation, exposure, and biological effects of chemicals in the environment. This resource is also available on CD-ROM

Thermophysical Properties of Pure Fluids and Aqueous Systems at High Temperatures and High Pressures

This book is a systematic presentation of the methods that have been developed for the interpretation of molecular modeling to the design of new chemicals. The main feature of the compilation is the co-ordination of the various scientific disciplines required for the generation of new compounds. The five chapters deal with such areas as structure and properties of organic compounds, relationships between structure and properties, and models for structure generation. The subject is covered in sufficient depth to provide readers with the necessary background to understand the modeling techniques. The book will be of value to chemists in industries involved in the manufacture of organic chemicals such as solvents refrigerants, blood substitutes, etc. It also serves as a reference work for researchers, academics, consultants, and students interested in molecular design.

The Yaws Handbook of Physical Properties for Hydrocarbons and Chemicals

In this thesis, attention was paid to several novel oxygenated fuels—carbonates, polyethers and ketones. Combustion kinetic investigations were performed for typical representative compounds, including dimethyl carbonate, diethyl carbonate, cyclopentanone, 3-pentanone, 1,2-dimethoxyethane and dimethoxymethane. For experiments, suitable diagnostic techniques were used to measure the detailed speciation information of the target fuels under different conditions. For kinetic modeling, rate coefficients for crucial elementary reactions were obtained through high-level theoretical calculations. Based on that, validated kinetic models with good predictive performances were developed. On the basis of experimental measurements and model interpretations, this work highlighted two important combustion characteristics regarding the practical use: the pollutant formation and the ignition performance. Besides, the correlation between oxygen-containing functional groups and the aforementioned combustion characteristics was revealed. To reveal the potential interactions between the reaction networks of oxygenated additives and the hydrocarbon base fuels during combustion. Chemical structures of laminar premixed flames fueled by binary fuels were measured, and by changing the initial fuel compositions, the addition effects of the oxygenates on the fuel consumption and pollutant formation behaviors were explored. It was found that complicated chemical interactions do not exist in the reaction networks under the investigated conditions.

TRC Thermodynamic Tables - Non-hydrocarbons

This book documents pioneering mathematical models introduced for the simulation of multi-component droplets heating and evaporation processes which are implementable into commercial CFD codes. These models, described as 'multi-dimensional quasi discrete' (MDQD) and 'discrete-component' models, were applied to automotive fuel droplets in experimentally measured internal combustion engine conditions for biodiesel, diesel, and gasoline fuels. For instance, it is shown that the suggested models lead to accurate predictions of temperatures and evaporation times in typical diesel and gasoline engine conditions. Such models have also reduced CPU time about 85% compared with cases when classical approaches are used.

Applied Hydrocarbon Thermodynamics

Providing a clear and systematic description of droplets and spray dynamic models, this book maximises reader insight into the underlying physics of the processes involved, outlines the development

of new physical and mathematical models and broadens understanding of interactions between the complex physical processes which take place in sprays. Complementing approaches based on the direct application of computational fluid dynamics (CFD), Droplets and Sprays treats both theoretical and practical aspects of internal combustion engine process such as the direct injection of liquid fuel, subcritical heating and evaporation. Including case studies that illustrate the approaches relevance to automotive applications, it is also anticipated that the described models can find use in other areas such as in medicine and environmental science.

˜Theœ Chemical Thermodynamic Properties of Hydrocarbons and Related Substances

Physical constants. Characteristics of petroleum fractions. Molecular weight. Vapor pressure. Fugacity. Critical properties. Thermal properties. Density. Viscosity. Combustion. Flow of fluids. Flow of heat. Equilibrium flash vaporization. Fractionating towers.

Chemistry Data Book

The Chemistry of Hydrocarbon Fuels is concerned with the chemical aspects of hydrofuels such as coal, petroleum, and natural gas. Topics covered include diagenesis and catagenesis, processing of natural gas and petroleum fractions, coal combustion, and chemicals that can be obtained from fuels. This book is comprised of 14 chapters and begins with a comprehensive treatment of the formation of fuels from accumulated organic matter, along with the organic geochemistry of coal, oil, and gas. The following chapters focus on the composition of hydrocarbon fuels and some of their important physical properties. Production and use of synthesis gas, alternate fuels from coal, and oxygenated fuels are considered. The remaining chapters deal with some of the chemistry of separation, refining, and use of hydrocarbon fuels. This monograph is written primarily for practicing scientists and engineers, fuel scientists, petroleum chemists, and those who are new to the field of fuel science and seek an introduction to fuel chemistry.

Thermodynamic and Physical Property Data

This book promotes a basic understanding of the concept of solubility and miscibility between halogenated hydrocarbons and water. It points out the regularities existing between solubility and physical properties of solute and solvent. The book is valuable to chemists and chemical engineers.

Droplets and Sprays: Simple Models of Complex Processes

Introduction to Petroleum Chemicals emerged from a series of lectures on the petroleum chemical industry given at the Manchester College of Science and Technology during the fall and winter of 1959. The book does not claim to be an exhaustive treatment of petroleum chemicals, but attempts to a survey of the important aspects of the industry at its present level of development. The course was given by chemists and chemical engineers engaged in the chemical industry of Britain, giving the text a British and European, as distinct from American, flavor. The book begins with a discussion of the cracking to olefins of liquid hydrocarbons. This is followed by separate chapters on separation processes for olefins; derivatives of ethylene and propylene; olefin polymerization process; and properties of polyethylenes and polypropylenes. Subsequent chapters cover the production and utilization of butadiene and isobutylene; aromatics production; manufacturing, properties, and uses of styrene and polystyrene; production of acetylene from hydrocarbons; and the carbon black industry.

Chemical Process Engineering Volume 1

Our world is widely contaminated with damaging chemicals, and companies create thousands of new, potentially dangerous chemicals each year. Due to the difficulty and expense of obtaining accurate measurements and the unreliability of reported values, we know surprisingly little about the properties of these contaminants. Determining the properties of chemicals is critical to judging their impact on environmental quality and in making decisions about emission rates, clean-up, and other important public health issues. Chemical Property Estimation describes modern methods of estimating chemical properties, methods which cost much less than traditional laboratory techniques and are sufficiently accurate for most environmental applications. Estimation methods are used to screen chemicals for testing, design monitoring and analysis methods, design clean-up procedures, and verify experimental measurements. The book discusses key methods for estimating chemical properties and considers their relative strengths and weaknesses. Several chapters are devoted to the partitioning of chemicals

between air, water, soil, and biota; and properties such as solubility, vapor pressure, and chemical transport. Each chapter begins with a review of relevant theory and background information explaining the applications and limitations of each method. Sample calculations and practical advice on how and when to use each method are included as well. Each method is evaluated for accuracy and reliability. Computer software, databases, and internet resources are evaluated, as well as other supplementary material, such as fundamental constants, units of measure, and more.

Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals, Second Edition

Molecular Design