Intermolecular Forces And Liquids And Solids

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Introduction to Applied Colloid and Surface Chemistry Butterworth-Heinemann
This book is concerned with recent experimental and theoretical work dealing with phenomena created by the transient dipoles and polarizabilities produced by intermolecular interactions. The for mer produce absorption from the microwave to the optical regions of the spectrum and the latter produce Rayleigh and Raman scattering; such absorption and scattering would be absent without collisions. Static properties, such as dielectric constant, refractive index, and Kerr effect, also exhibit the effects of induced dipoles and polarizabilities. The first observation of an infrared absorption spectrum pro duced by the collisions of molecules which ordinarily do not have an allowed dipole transition was reported in 1949 (Crawford, Welsh, and Locke). The first observation of depolarized Rayleigh spectra due to collisions in atomic gases appeared in 1968 (McTague and Birnbaum). However, it was not until 1977 that the first conference dealing with collision-induced phenomena was organized by J. D. Poll at the University of Guelph. This conference was mainly concerned with studies of collision-induced absorption in gases. Light scat tering received more attention at the second meeting of the colli sion-induced community in 1978, at the E. Fermi Summer School on "Intermolecular Spectroscopy and Dynamical Properties of Dense Sys tems," organized by J. Van Kranendonk. However, the emphasis was still on collision-induced absorption in compressed gases, although some work on liquids, solid H , and related subjects such as ro 2 tational relaxation was included. The third induced phenomena con ference, organized by F.
Intermolecular Forces in Liquids Oxford University Press, USA
Proceedings of the 14th Jerusalem Symposium on Quantum Chemistry and Biochemistry, Jerusalem, Israel, April 13-16, 1981
The Forces Between Molecules The Rosen Publishing Group, Inc
Chemistry 2e
Cohesion Springer Science & Business Media
The mechanisms for vibrational linewidth broadening in liquids are investigated using the temperature dependence of coherent picosecond Stokes scattering. Both rapidly varying repulsive and slowly varying attractive intermolecular forces are determined to cause significant linewidth broadening. The liquid's local number density distribution width is shown to play an important role in inhomogeneous linewidth broadening. This is in agreement with both the model of George, Auweter and Harris and the recent theory by Schweizer and Chandler.
Vibrational Linewidth Broadening Mechanisms in Liquids Revealed by the Separation of the Rapidly and Slowly Varying Intermolecular Forces Springer Science & Business Media
This ASI was planned to make a major contribution to the teaching of the principles and methods used in liquid phase ~esearch and to encourage the setting up of collaborative projects, as advocated by the European Molecular Liquids Group (secretary: Dr J. Yarwood, University of Durham, U. K.). During the past five years considerable progress has been made in studying molecular liquids. The undoubted advantages of international

collaboration led to the formation of the European Molecular Liquids Group (EMLG) in July 1981. The activities of the EMLG were widely disseminated in a special session of the European Congress on Molecular Spectroscopy (EUCMOS) held in September 1981 (for details, see J. Mol. Structure, 80 (1982) 375 - 421). Following the success of this meeting, it was thought that the aims and objectives of the E~G would be best served by the organisation of a broader-based gathering designed to attract those interested in the study of the structure, dynamics and interactions in the liquid state. Thanks to the generous support by the Scientific Affairs Division of NATO, it was possible to hold a NATO ASI on Molecular Liquids at the Italian Centre of Stanford University, Florence, Italy during June-July 1983. This book is based on the lectures presented at that meeting. The contents of this volume cover the three broad areas of current liquid phase research: (a) Analytical theory.

Intermolecular and Surface Forces Springer Science & Business Media

An essential cross-disciplinary reference for molecular interactions Molecular Theory of Gases and Liquids offers a rigorous, comprehensive treatment of molecular characteristics and behaviors in the gaseous and fluid states. A unique cross-disciplinary approach provides useful insight for students of chemistry, chemical engineering, fluid dynamics, and a variety of related fields, with thorough derivations and in-depth explanations throughout. Appropriate for graduate students and working scientists alike, this book details advanced concepts without sacrificing depth of coverage or technical detail.

Molecular Liquids John Wiley & Sons

Have you ever seen an insect walk on water? How can it do that? Because of the special property exclusive to liquids called surface tension. Readers will solve this and a number of other mysteries surrounding this state of matter as they learn about its various properties. Colorful diagrams and photographs help readers grasp physical science concepts.

Chemistry Springer Science & Business Media

The Theory of Intermolecular Forces sets out the mathematical techniques needed to describe and calculate intermolecular interactions in physics and chemistry, and to handle the more elaborate mathematical models used to represent them.

Physics of Simple Liquids--some Current Studies on Structure and Intermolecular Forces in Simple Fluids, Dielectric Phenomena in Nonpolar Liquids, and Thermodynamic and Transport Singularities at Critical States Springer Science & Business Media

Colloid and Surface Chemistry is a subject of immense importance and implications both to our everyday life and numerous industrial sectors, ranging from coatings and materials to medicine and biotechnology. How do detergents really clean? (Why can't we just use water?) Why is milk "milky"? Why do we use eggs so often for making sauces? Can we deliver drugs in better and controlled ways? Coating industries wish to manufacture improved coatings e.g. for providing corrosion resistance, which are also environmentally friendly i.e. less based on organic solvents and if possible exclusively on water. Food companies want to develop healthy, tasty but also long-lasting food products which appeal to the environmental authorities and the consumer. Detergent and enzyme companies are working to develop improved formulations which clean more persistent stains, at lower temperatures and amounts, to the benefit of both the environment and our pocket. Cosmetics is also big business! Creams, lotions and other personal care products are really just complex emulsions. All of the above can be explained by the principles and methods of colloid and surface chemistry. A course on this topic is truly valuable to chemists, chemical engineers, biologists, material and food scientists and many more.

Theory of Intermolecular Forces CRC Press

A quick reference to basic science for anaesthetists, containing all the key information needed for FRCA exams.

Intermolecular Forces CRC Press

Existing texts on the statistical mechanics of liquids treat only spherical molecules. However, nearly all fluids of practical interest are composed of non-spherical molecules that are often dipolar or exhibit other kinds of electrostatic forces. This book describes the statistical mechanical theory of fluids of non-spherical molecules and its application to the calculation of physical properties, and is a sequel to Theory of Molecular Fluids. Volume 1: Fundamentals by C.G. Gray and K.E. Gubbins. The emphasis is on the new phenomena that arise due to the non-spherical nature of the intermolecular forces, such as new phase transitions, structural features and dielectric effects. It contains chapters on the thermodynamic properties of pure and mixed fluids, surface properties, X-ray and neutron diffraction structure factors, dielectric properties and spectroscopic properties. The book is aimed at beginning graduate students and research workers in chemistry, physics, materials science and engineering.

Liquids and Liquid Mixtures Oxford University Press, USA

Why does matter stick together? Why do gases condense to liquids, and liquids to solids? This book provides a detailed historical account of how some of the leading scientists of the past three centuries have tried to answer these questions.

CK-12 Chemistry - Second Edition Oxford University Press

Describes at an introductory level the nature of intermolecular forces and their influence on the properties of solids, liquids, and gases. A more advanced treatment of the subject may be found in the same authors' 'Intermolecular Forces'.

Intermolecular Forces Oxford University Press

Theory of Intermolecular Forces deals with the exposition of the principles and techniques of the theory of intermolecular forces. The text focuses on the basic theory and surveys other aspects, with particular attention to relevant experiments. The initial chapters introduce the reader to the history of intermolecular forces. Succeeding chapters present topics on short, intermediate, and long range atomic interactions; properties of Coulomb interactions; shape-dependent forces between molecules; and physical adsorption. The book will be of good use to experts and students of quantum mechanics and advanced physical chemistry.

Gases, Liquids and Solids Springer Science & Business Media

Physical Chemistry for the Biosciences has been optimized for a one-semester introductory course in physical chemistry for students of biosciences.

Molecular Liquids: New Perspectives in Physics and Chemistry Elsevier

The present theme concerns the forces of nature, and what investigations of these forces can tell us about the world we see about us. The story of these forces is long and complex, and contains many episodes that are not atypical of the bulk of scientific research, which could have achieved greater acclaim 'if only...'. The intention of this book is to introduce ideas of how the visible world, and those parts of it that we cannot observe, either because they are too small or too large for our scale of perception, can be understood by consideration of only a few fundamental forces. The subject in these pages will be the authority of the commonly termed, laws of physics, which arise from the forces of nature, and the corresponding constants of nature (for example, the speed of light, c, the charge of the electron, e, or the mass of the electron, me).

Polymer Networks The Rosen Publishing Group, Inc

Liquids and Liquid Mixtures, Third Edition explores the equilibrium properties of liquids and liquid mixtures and relates them to the properties of the constituent molecules using the methods of statistical thermodynamics. Topics covered include the critical state, fluid mixtures at high pressures, and the statistical thermodynamics of fluids and mixtures. This book consists of eight chapters and begins with an overview of the liquid state and the thermodynamic properties of liquids and liquid mixtures, including vapor pressure and heat capacities. The discussion then turns to the thermodynamics of and inequalities at the critical point; measurement of thermodynamic functions in the critical region; experimental values of the critical exponents; and scaling of the free energy. The change of thermodynamic functions with composition is the subject of the next two chapters, followed by an analysis of fluid mixtures at high pressures. The final chapter is devoted to the statistical thermodynamics of fluids and mixtures, paying particular attention to the thermodynamic properties in terms of the forces between the molecules; the balance of intermolecular potentials between like and unlike molecules; and phase behavior. This monograph will be of interest to students and researchers in the fields of chemistry and chemical engineering.

Intermolecular Interactions John Wiley & Sons

Emphasises on contemporary applications and an intuitive problem-solving approach that helps students discover the exciting potential of chemical science. This book incorporates fresh applications from the three major areas of modern research: materials, environmental chemistry, and biological science.

Chemistry Springer Science & Business Media

For several decades, polymer science has sought to rationalize the mechanical and thermodynamic properties of polymer networks largely within the framework of statistical thermodynamics. Much of this effort has been directed toward the rubbery rather than the glassy state. It is generally assumed that networks possess an av erage composition to which average properties may be assigned; from such a continuum view, a powerful analysis of such properties as modulus, swelling, birefringence and thermoelasticity has emerged. In the years following the rise of polymer characterization (the late 40's and early 50's), many scientists began to study ap parent relations between the properties of linear polymer molecules and the networks obtainable therefrom. This search was also stimu lated by the wide range of applications of polymer networks in com mercial elastomers, thermosets and coatings. Frequently, these data were confidently matched with curves obtained from statisti cally describable models of networks of ghost chains, uniformly distributed in space. More recently, it has become apparent that polymer chains in networks are not as ideal as assumed in the formulation of statis tical models, and there has been a shift in emphasis towards the less than ideal, perturbed and possibly inhomogeneous networks which are more frequently encountered in practice. The continuum approach, however, had to be developed before inhomogeneous systems could be described; the present volume, therefore, contains both views.

Intermolecular and Surface Forces Cengage Learning

First published in 1949, this book assesses the phenomena of surface tension and spreading for various liquids.