



## Lehrbuch der Physikalischen Chemie

The physical chemistry textbook by Gerd Wedler, which is a standard text in German-speaking countries, has now been published in a 6th edition, co-authored by Hans-Joachim Freund, who was asked by the heirs of the late Gerd Wedler to continue the textbook.

The introductory chapter, comprising 260 pages, deals with the fundamentals of thermodynamics, quantum theory, kinetics, and electrochemistry. In the latest edition, a section on diffraction has been added; it summarizes the fundamental principles of the diffraction of electromagnetic waves and matter waves, which play a central role in modern physical chemistry. This introduction is profound and comprehensive, and thus the following chapters can build upon this knowledge, with no need for repetition.

The following chapter on chemical thermodynamics covers all aspects of chemical equilibrium, including equilibrium electrochemistry, in a clear and detailed way. Under the heading “Aufbau der Materie” (structure of matter), the book gives an introduction to the quantum theory of chemically relevant model systems. The spectroscopy of atoms is covered extensively, thus helping the reader to understand state-of-the-art analytical tools in inorganic chemistry. The treatment of light absorption in the framework of the time-dependent Schrödinger equation paves the way to a discussion of molecular spectroscopy. The chapter is rounded off by a review of current knowledge about the structures of solids, solid surfaces, liquids, and liquid crystals. For the next edition it would be useful to include a subsection devoted to photochemistry, which could cover fundamental processes such as photodissociation or radiationless relaxation through conical intersections, explained on the basis of potential energy surfaces.

The chapter on the statistical theory of matter includes a mathematical derivation of the Bose–Einstein and Fermi–Dirac statistics, which are applied to the electron gas and photon gas. A

special joy to read is the section on the heat capacity of solids, which includes an extensive treatment and critical discussion of the Einstein and Debye formalisms. Transport phenomena are treated in a separate chapter, following the logical structure of the textbook.

The final chapter is devoted to kinetics, since the treatment of this topic builds on the results and methods acquired in the previous chapters. Fundamental concepts of reaction dynamics are introduced by discussing crossed molecular beams. The sections on homogeneous and heterogeneous catalysis are comprehensive and applications-oriented. A mathematical appendix summarizes essential concepts of advanced mathematics, which are required for an understanding of the subject.

Whenever possible, the textbook provides detailed mathematical derivations, which are clearly explained step-by-step, making the book ideal for self-study. The concepts are formulated in a scientifically precise way, and illustrated with practical examples. The figures are clear and understandable, but unfortunately some of them are too small, with backgrounds in shades of blue and grey and with insufficient contrast.

A workbook is available for the first time with the 6th edition of the textbook. It contains extensive and didactically excellent solutions to all the exercises in the book. The workbook greatly enhances the value of the textbook, both during learning and during the preparation for exams.

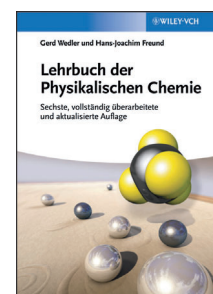
The textbook and workbook are primarily intended for students with chemistry as their main subject. Students training to become chemistry teachers will benefit most from the “Wedler–Freund” textbook if their second subject is mathematics or physics. For lecturers in physical chemistry, the books are a valuable reference source. If one needs to know how something really works, the “Wedler–Freund” book is the first choice.

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