

PHYSICAL CHEMISTRY

AN ADVANCED TREATISE

Edited by

HENRY EYRING

DOUGLAS HENDERSON

WILHELM JOST

VOLUME I

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PHYSICAL CHEMISTRY

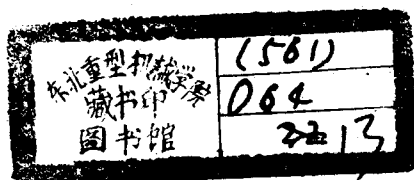
An Advanced Treatise

VOLUME I / Thermodynamics

Edited by

WILHELM JOST

*Institut für Physikalische
Chemie der Universität Göttingen
Göttingen, Germany*



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List of Contributors

Numbers in parentheses indicate the pages on which the authors' contributions begin.

S. M. Blinder, Chemistry Department, University of Michigan, Ann Arbor, Michigan (613)

E. U. Franck, Institut für Physikalische Chemie, Universität Karlsruhe, Karlsruhe, Germany (367)

R. Haase, Institut für Physikalische Chemie, Technische Universität Aachen, Aachen, Germany (1, 239)

Max Klein, Equation of State Section, Heat Division, National Bureau of Standards, Washington, D.C. (489)

H. Krempl, Institut für Physikalische Chemie und Electrochemie der Technischen Universität München, Munich, Germany (545)

A. Sanfeld, Faculte des Sciences, Chimie Physique 2, Université Libre de Bruxelles, Brussels, Belgium (99, 217, 245)

Herbert Stenschke, Batelle Memorial Institute, Columbus, Ohio (403)

Robert H. Wentorf, Jr., General Electric Research and Development Center, Schenectady, New York (571)

J. Wilks, Clarendon Laboratory, University of Oxford, Oxford, England (437)

Foreword

In recent years there has been a tremendous expansion in the development of the techniques and principles of physical chemistry. As a result most physical chemists find it difficult to maintain an understanding of the entire field.

The purpose of this treatise is to present a comprehensive treatment of physical chemistry for advanced students and investigators in a reasonably small number of volumes. We have attempted to include all important topics in physical chemistry together with borderline subjects which are of particular interest and importance. The treatment is at an advanced level. However, elementary theory and facts have not been excluded but are presented in a concise form with emphasis on laws which have general importance. No attempt has been made to be encyclopedic. However, the reader should be able to find helpful references to uncommon facts or theories in the index and bibliographies.

Since no single physical chemist could write authoritatively in all the areas of physical chemistry, distinguished investigators have been invited to contribute chapters in the field of their special competence.

If these volumes are even partially successful in meeting these goals we will feel rewarded for our efforts.

We would like to thank the authors for their contributions and to thank the staff of Academic Press for their assistance.

HENRY EYRING
DOUGLAS HENDERSON
WILHELM JOST

Preface

Thermodynamics, complete in its fundamental development, is a necessary tool for the chemist in almost all fields, and new lines are generally induced by the requirements of applications. Thus this volume starts with a survey of basic laws, as a preparation for the several topics to be covered in later chapters. Emphasis is placed on questions of stability, irreversible processes, surfaces, the third law, and a short introduction to Carathéodory's axiomatic foundation.

This volume deals with the applications of thermodynamics to mixtures, to fluids and solid systems at high pressures and temperatures, to critical phenomena, to the practical handling of coupled gas equilibria, and to matter in electric, magnetic, and gravitational fields.

The editor had been fortunate in having had the cooperation of A. Michels, Amsterdam, with his superior experimental and theoretical knowledge in the field of equation of state. It is a great loss for this volume that this outstanding man was taken from us, still in the middle of his work, though of a biblical age.

WILHELM JOST

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Chapter 5 / COORDINATION COMPOUNDS

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