REFRACTORY MATERIALS

A SERIES OF MONOGRAPHS

VOLUME 6-III

PHASE DIAGRAMS

Materials Science and Technology

VOLUME III

The Use of Phase Diagrams in
Electronic Materials and Glass Technology

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DEDICATED TO

Professor Rustum Roy

for the pioneering work he has done in the field of phase equilibrium and materials science.

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List of Contributors

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

A. R. COOPER (237), Department of Metallurgy, Case Western Reserve University, Cleveland, Ohio

B. C. GIESSEN (103), Department of Chemistry, Northeastern University, Boston, Massachusetts

T. R. KOZLOWSKI (271), Research and Development Laboratories, Corning Glass Works, Corning, New York

ERNEST M. LEVIN (143), National Bureau of Standards, Washington, D.C.

M. F. MERRIAM (87), Department of Mineral Technology, College of Engineering, University of California, Berkeley, California

R. R. MONCHAMP (1), Research Division, Raytheon Company, Waltham, Massachusetts

J. W. NIELSEN (1), Bell Telephone Laboratories, Incorporated, Murray Hill, New Jersey

M. B. PANISH (53), Bell Telephone Laboratories, Incorporated, Murray Hill, New Jersey

K. M. RALLS (87), Department of Mechanical Engineering, University of Texas, Austin, Texas

E. F. RIEBLING* (253), Research and Development Laboratories, Corning Glass Works, Corning, New York

R. H. WILLENS (103), Bell Telephone Laboratories, Murray Hill, New Jersey

V. F. ZACKAY (87), Inorganic Materials Research Division, Lawrence Radiation Laboratory, Berkeley, California

* Present address: Institute of Polymer Science, The University of Akron, Akron, Ohio.

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Foreword

Perhaps no area of science is regarded as basic in so many disciplines as that concerned with phase transitions, phase diagrams, and the phase rule. Geologists, ceramists, physicists, metallurgists, material scientists, chemical engineers, and chemists all make wide use of phase separations and phase diagrams in developing and interpreting their fields. New techniques, new theories, computer methods, and an infinity of new materials have created many problems and opportunities which were not at all obvious to early researchers. Parodoxically, formal courses and modern, authoritative books have not been available to meet their needs.

Since it is the aim of this series to provide a set of modern reference volumes for various aspects of materials technology, and especially for refractory materials, it was logical for Dr. Allen Alper to undertake this new coverage of "Phase Diagrams: Materials Science and Technology" by bringing together research ideas and innovative approaches from diverse fields as presented by active contributors to the research literature. It is my feeling that this extensive and intensive treatment of phase diagrams and related phenomena will call attention to the many techniques and ideas which are available for use in the many materials-oriented disciplines.

JOHN L. MARGRAVE

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Preface

Many recent advances in materials science and technology have been made by scientists, engineers, and technologists who have used phase diagrams to solve materials problems. Many books have been written on the use of phase diagrams in the heat treatment of metals; however, the use of phase diagrams in other areas of materials science and technology has not been as thoroughly covered. Also, there have been numerous advances in this field in the last five years which have not appeared elsewhere than in this volume.

This volume deals with the use of phase diagrams in electronic materials and glass technology. Each article has been written by an authority in the field. The contents should be extremely useful to all scientists and engineers who are investigating and developing materials and to those who are using materials. It should also help in the education of materials science students.

The editor wishes to thank Professor John L. Margrave of Rice University and Dr. John H. Munier of Corning Glass Works. Thanks are also due to Corning Glass Works and Sylvania Electric Products Inc. for their assistance. Special thanks are given to all the authors who have contributed articles to this volume. The editor is particularly grateful for the many papers submitted by scientists of the Bell Telephone Company.

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