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Proceedings of the Fourth International Symposium on Electrochemistry in Mineral

and Metal Processing

Springer Science & Business Media

U.S. Geological Survey research on the geology, geophysics, and geochemistry of radon in rocks, soils, and water.

Mineral Equilibria at Low Temperature and Pressure

American Society of Agronomy

Many Neogene hydrothermal ore deposits have been formed on and near the Japanese islands from the middle Miocene to the present day and today many subaerial and submarine active geothermal systems are active. This book summarizes the geochemical and tectonic features, and the evolution of various types of ore deposits and current island arc and backarc hydrothermal systems in Japan starting with the Mesozoic.

Principles of Igneous and Metamorphic Petrology

Columbia University Press

Today large numbers of geoscientists apply thermodynamic theory to solu tions of a variety of problems in earth and planetary sciences. For most problems in chemistry, the application of thermodynamics is direct and rewarding. Geoscientists, however, deal with complex inorganic and organic substances. The complexities in the nature of mineralogical substances arise due to their involved crystal structure and multicomponental character. As a result, thermochemical solutions of many geological-planetological problems should be attempted only with a clear understanding of the crystal-chemical and thermochemical character of each mineral. The subject of physical geochemistry deals with the elucidation and

application of physico-chemical principles to geosciences. Thermodynamics of mineral phases and crystalline solutions form an integral part of it. Developments in mineralogic thermody namics in recent years have been very encouraging, but do not easily reach many geoscientists interested mainly in applications. This series is to provide geoscientists and planetary scientists with current information on the develop ments in thermodynamics of mineral systems, and also provide the active researcher in this rapidly developing field with a forum through which he can popularize the important conclusions of his work. In the first several volumes, we plan to publish original contributions (with an abundant supply of back ground material for the uninitiated reader) and thoughtful reviews from a number of researchers on mineralogic thermodynamics, on the application of thermochemistry to planetary phase equilibria (including meteorites), and on kinetics of geochemical reactions.

SOLMINEQ.88, a Computer Program for Geochemical Modeling of Water-rock Interactions Springer Science & Business Media

Soil Genesis and Classification, Sixth Edition, builds on the success of the previous editions to present an unparalleled resource on soil formation and classification. Featuring

a color plate section containing multiple soil profiles, this text also includes information on new classification systems and emerging technologies and databases with updated references throughout. Covering the diverse needs of both the academic and professional communities, this classic text will be a must have reference for all those in soil science and related fields.

PHREEQE Walter de Gruyter GmbH & Co KG

This book represents a revision and expansion of an earlier set of diagrams for tempera 0 0 tures from 25 to 300 C along the equilibrium vapor-liquid curve for H 0 (Helgeson, Brown, 2 and Leeper, 1969). The activity diagrams summarized in the following pages were generated over a six year period from 1977 to 1983 in the Laboratory of Theoretical Geochemistry (oth erwise known as Prediction Centra!) at the University of California, Berkeley. They represent the culmination of research efforts to generate a comprehensive and internally consistent set of thermodynamic data and equations for minerals, gases, and aqueous solutions at high pres sures and temperatures. Among the many who contributed to the successful completion of this book, we are especially indebted to David Kirkham, John Walther, and George Flowers, who wrote program SUPCRT, Tom Brown, who created program DIAGRAM, and Eli Mess inger, who

generated the Tektronix plot routine to construct the diagrams. Ken Jackson and Terri Bowers both devoted an enormous amount of time and effort over the past six years to produce the diagrams in the following pages; some of which went through many stages of revision. Consequently, they appear as senior authors of this volume. It should be mentioned in this regard that their equal dedication to the project made it necessary to determine their order of authorship by flipping a coin.

U.S. Geological Survey Bulletin Elsevier

This textbook provides a basic understanding of the formative processes of igneous and metamorphic rock through quantitative applications of simple physical and chemical principles. The book encourages a deeper comprehension of the subject by explaining the petrologic principles rather than simply presenting the student with petrologic facts and terminology. Assuming knowledge of only introductory college-level courses in physics, chemistry, and calculus, it lucidly outlines mathematical derivations fully and at an elementary level, and is ideal for intermediate and advanced courses in igneous and metamorphic petrology. The end-of-chapter quantitative problem sets facilitate student learning by working through simple applications. They also introduce several widely-used thermodynamic software programs for

calculating igneous and metamorphic phase equilibria and image analysis software. With over 350 illustrations, this revised edition contains valuable new material on the structure of the Earth's mantle and core, the properties and behaviour of magmas, recent results from satellite imaging, and more.

Geochemistry American Geophysical Union

This book provides a comprehensive introduction to the field of geochemistry. The book first lays out the 'geochemical toolbox': the basic principles and techniques of modern geochemistry, beginning with a review of thermodynamics and kinetics as they apply to the Earth and its environs. These basic concepts are then applied to understanding processes in aqueous systems and the behavior of trace elements in magmatic systems. Subsequent chapters introduce radiogenic and stable isotope geochemistry and illustrate their application to such diverse topics as determining geologic time, ancient climates, and the diets of prehistoric peoples. The focus then broadens to the formation of the solar system, the Earth, and the elements themselves. Then the composition of the Earth itself becomes the topic, examining the composition of the core, the mantle, and the crust and exploring how this

structure originated. A final chapter covers organic chemistry, including the origin of fossil fuels and the carbon cycle's role in controlling Earth's climate, both in the geologic past and the rapidly changing present. Geochemistry is essential reading for all earth science students, as well as for researchers and applied scientists who require an introduction to the essential theory of geochemistry, and a survey of its applications in the earth and environmental sciences. Additional resources can be found at: www.wiley.com/go/white/geochemistry

Metamorphic Pressure-temperature-time Paths

John Wiley & Sons

An introduction to soil mineralogy; Surface chemistry of soil minerals; An introduction to organic matter in mineral soils; Mineral equilibria and the soil system; Mineral occurrence in soil environments; Carboonate, halide, sulfate, and sulfide minerals; Aluminum oxides and oxyhydroxides; Iron oxides; Manganese oxides ands hydroxides; Kaolin and serpentine group minerals; The pyrophyllite-talc group; Micas; Vermiculites; Chlorites and hydroxy-interlayered vermiculite and smectite; Interstratification in layer silicates; Palygorskite and sepiolite group minerals; Zeolites in soils; Silica in soils: quartz and disordered silica

polymorphs; Feldpars, olivines, pyroxenes, and amphiboles; Allophane and imogolite; Phosphate minerals; Titanium and zirconium minerals.

Coalfields of New Mexico
John Wiley & Sons
Volume 26 of Reviews in Mineralogy provides a multidisciplinary review of our current knowledge of contact metamorphism. As in any field of endeavor, we are provided with new questions, thereby dictating future directions of study. Hopefully, this volume will provide inspiration and direction for future research on contact metamorphism. The Mineralogical Society of America sponsored the short course on Contact Metamorphism, October 17-19, 1991, at the Pala Mesa Resort, Fallbrook, California, prior to its annual meeting with the Geological Society of America.

Petrogenesis of Metamorphic Rocks
Editorial CSIC - CSIC Press
This book considers molecular structural information, statistical methods and thermodynamic measurements, and the ways in which the relative role of each differs from another. By putting together selected papers in a single publication, the book highlights the cohesive aspects of certain advances through time and development, and can aid historical studies. Several papers

from journals not widely circulated can also be found in this selection of papers.

Molecular Structure and Statistical Thermodynamics

Cambridge University Press

Volume 38 of Reviews in Mineralogy provides detailed reviews of various aspects of the mineralogy and geochemistry of uranium. We have attempted to produce a volume that incorporates most important aspects of uranium in natural systems, while providing some insight into important applications of uranium mineralogy and geochemistry to environmental problems. The result is a blend of perspectives and themes: historical (Chapter 1), crystal structures (Chapter 2), systematic mineralogy and paragenesis (Chapters 3 and 7), the genesis of uranium ore deposits (Chapters 4 and 6), the geochemical behavior of uranium and other actinides in natural fluids (Chapter 5), environmental aspects of uranium such as microbial effects, groundwater contamination and disposal of nuclear waste (Chapters 8, 9 and 10), and various analytical techniques applied to uranium-bearing phases (Chapters 11-14). This volume was written in preparation for a short course by the same title, sponsored by the Mineralogical Society of America, October 22 and 23, 1999 in Golden, Colorado, prior to MSA's joint annual meeting with the Geological Society of America.

Incomplete Solution

Walter de Gruyter GmbH & Co KG

Field Studies of Radon in Rocks, Soils, and Water focuses on the principal sources of indoor radon and detecting radon through geochemical and hydrological studies of ground water. The book addresses how to

measure radon, covers geological field study techniques, and presents techniques for assessing radon potential. The geochemical and hydrological studies of ground water cover such areas as health effects and radionuclides in geology. Techniques for measuring radon in ground water are also provided. Field Studies of Radon in Rocks, Soils, and Water is an excellent practical guide for geologists, geochemists, ground water professionals, and geophysicists interested in radon. Features

Geochemical Studies John Wiley & Sons

A collection of review articles by eminent petrologists, summarizing recent scientific achievements in this field. The papers address the physico-chemical conditions of the origin of crystalline rocks as well as characteristics of their mineral assemblages. The book is divided into three main sections: Section 1 covers general thermodynamics and mineral equilibria; Section 2 covers metamorphic and metasomatic processes; and the final section discusses the mantle and magmatic processes.

Progress in Metamorphic and Magmatic Petrology CRC Press

Building upon the award-winning second edition, this comprehensive textbook provides a fundamental understanding of the formative processes of igneous and metamorphic rocks. Encouraging a deeper comprehension of the subject by explaining the petrologic principles, and assuming knowledge of only introductory college-level courses in physics, chemistry, and

calculus, it lucidly outlines mathematical derivations fully and at an elementary level, making this the ideal resource for intermediate and advanced courses in igneous and metamorphic petrology. With over 500 illustrations, many in color, this revised edition contains valuable new material and strengthened pedagogy, including boxed mathematical derivations allowing for a more accessible explanation of concepts, and more qualitative end-of-chapter questions to encourage discussion. With a new introductory chapter outlining the “bigger picture,” this fully updated resource will guide students to an even greater mastery of petrology.

Solutions, Minerals, and Equilibria World Scientific Written expressly for undergraduate and graduate geologists, this book focuses on how geochemical principles can be used to solve practical problems. The attention to problem-solving reflects the authors'belief that showing how theory is useful in solving real-life problems is vital for learning. The book gives students a thorough grasp of the basic principles of the subject, balancing the traditional equilibrium perspective and the kinetic viewpoint. The first half of the book considers processes in which temperature and pressure are nearly constant. After introductions to the laws of thermodynamics, to fundamental equations for flow and diffusion, and to solution chemistry, these principles are used to investigate diagenesis, weathering, and natural waters. The second half of

the book applies thermodynamics and kinetics to systems undergoing changes in temperature and pressure during magmatism and metamorphism. This revised edition incorporates new geochemical discoveries as examples of processes and pathways, with new chapters on mineral structure and bonding and on organic matter and biomarkers. Each chapter has worked problems, and the authors assume that the student has had a year of college-level chemistry and a year of calculus. Praise for the first edition "A truly modern geochemistry book.... Very well written and quite enjoyable to read.... An excellent basic text for graduate level instruction in geochemistry." —Journal of Geological Education "An up-to-date, broadly conceived introduction to geochemistry.... Given the recent flowering of geochemistry as an interdisciplinary science, and given the extent to which it now draws upon the fundamentals of thermodynamics and kinetics to understand earth and planetary processes, this timely and rigorous [book] is welcome indeed." —Geochimica et Cosmochimica Acta

Principles of Igneous and Metamorphic Petrology The Electrochemical Society Metamorphic rocks make up the largest volume of the Earth. They systematically change their mineralogical composition as a result of

tecto-thermal events. The outstanding feature of the 7th edition of this book is the large number of phase diagrams showing the stability relations among minerals and groups of minerals found in metamorphic rocks. The diagrams help to determine the pressure and temperature conditions under which a given collected set of metamorphic rocks may have formed. More than half of the chapters have been completely rewritten or revised. All figures have been edited and improved and recent advances in the field such as multiequilibria thermobarometry and pseudosections were incorporated in the text. The bibliography has been revised and extended, new research publications have also been included. Graduate students will find in depth information on the origin, significance and genesis of metamorphic rocks.

Thermodynamics of Minerals and Melts Elsevier

A summary of the thermodynamic data for minerals at 298.15°K together with calculated values of the functions [...]H0f,T, [...]G0f,T, S0T, and -(G0T - H0298.5/T) at temperatures up to 2,000° K.

Micas Springer Science & Business Media

Volume 13 of Reviews in Mineralogy attempts to gather together much of our knowledge of micas, the most abundant phyllosilicate, and to indicate promising areas of future research. Chapters 1-3 lay the foundations of the classification, structures, and crystal chemistry of micas. Chapter 4 treats bonding and

electrostatic modeling of micas. Chapters 5 and 6 cover spectroscopic and optical properties. Chapters 7-13, the bulk of the volume, are devoted to geochemistry and petrology. These include phase equilibria and the occurrences, chemistry, and petrology of micas in igneous, metamorphic, and sedimentary rocks, pegmatites, and certain ore deposits. Some treatments are exhaustive. All are at the forefront of our present knowledge, and indicate clearly the practical applications'of the study of micas to ascertaining various parameters of origin and crystallization history, as well as the many problems that still exist. The aim of this type of treatment is to provide a reference volume for teachers and students and to enable researchers to pick more easily those directions and problems for which future research is most needed or is apt to be most productive or most challenging.

Field Studies of Radon in Rocks, Soils, and Water

CRC Press

Volume 10 of Reviews in Mineralogy reviews the use of a powerful probe into metamorphic process: mineral assemblages and the composition of minerals. Put very simply, this volume attempts to answer the question: "What can we learn about metamorphism through the study of minerals in metamorphic rocks?" It is not an encyclopedic summary of metamorphic mineral assemblages; instead it attempts to present basic research strategies and examples of their application. Moreover, in order to limit and unify the subject matter, it concentrates on the chemical aspects of metamorphism and regrettably ignores other important kinds of studies of metamorphic rocks and minerals conducted by structural geologists, structural petrologists, and geophysicists.

Field Studies of Radon

in Rocks, Soils, and Water Walter de Gruyter GmbH & Co KG

An evolving, living organic/inorganic covering, soil is in dynamic equilibrium with the atmosphere above, the biosphere within, and the geology below. It acts as an anchor for roots, a purveyor of water and nutrients, a residence for a vast community of microorganisms and animals, a sanitizer of the environment, and a source of raw materials

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