Introduction to Mineralogy and Petrology presents the essentials of both disciplines through an approach accessible to industry professionals, academic researchers, and students. Mineralogy and petrology stand as the backbone of the geosciences. Detailed knowledge of minerals and rocks and the process of formation and association are essential for practicing professionals and advanced students. This book is designed as an accessible, step-by-step guide to exploring, retaining, and implementing the core concepts of mineral and hydrocarbon exploration, mining, and extraction. Each topic is fully supported by working examples, diagrams and full-color images. The inclusion of petroleum, gas, metallic deposits and economic aspects enhance the book’s value as a practical reference for mineralogy and petrology. Authored by two of the world’s premier experts, this book is a must for any young professional, researcher, or student looking for a thorough and inclusive guide to mineralogy and petrology in a single source.

Authored by two of the world’s experts in mineralogy and petrology, who have more than 70 years of experience in research and instruction combined Addresses the full scope of the core concepts of mineralogy and petrology, including crystal structure, formation and grouping of minerals and soils, definition, origin, structure and classification of igneous, sedimentary and metamorphic rocks Features more than 150 figures, illustrations, and color photographs to vividly explore the fundamental principles of mineralogy and petrology Offers a holistic approach to both subjects, beginning with the formation of geologic structures followed by the hosting of mineral deposits and concluding with the exploration and extraction of lucrative, usable products to improve the health of global economies.

Phoscorites are dark, often very handsome, sometimes economically valuable, magnetite-apatite-silicate rocks, almost always associated with carbonatite. They are key to understanding the longstanding question of how carbonate and carbonate-bearing magmas rise to the crust and the Earths surface. Despite this, they have been given little attention; a search on geological literature databases will produce thousands of references to carbonatite (up to 4125 on Georef) but not more than thirty references to phoscorite. This book goes some way to redress this balance. Over recent years many European and North American scientists have studied Kola rocks in collaboration with Russian colleagues. The idea for this book came from one such project funded by the European organisation, INTAS (Grant No 97-0722). The Kola Peninsula is one of the outstanding areas in the World for the concentration and economic importance of alkaline rocks. However, Russian work on the Kola complexes is still relatively unknown and a particular aim of this book, as well as presenting current research, is to make this knowledge accessible to English language readers. A large exploration programme on Kola alkaline rocks was active from 1950 to 1990 and involved teams of geologists who studied many kilometres of drill core and carried out detailed mineralogical and petrological studies.

Decades of field and microscope studies, and more recent quantitative geochemical analyses have resulted in a vast, and sometimes overwhelming, array of nomenclature and terminology associated with igneous rocks. This book presents a complete classification of igneous rocks based on all the recommendations of the International Union of Geological Sciences (IUGS) Subcommission on the Systematics of Igneous Rocks. The glossary of igneous terms has been fully updated since the first edition and now includes 1637 entries, of which 316 are recommended by the Subcommission. Incorporating a comprehensive bibliography of source references for all the terms included in the glossary, this book is an indispensable reference guide for all geologists studying igneous rocks, either in the field or the laboratory. It presents a standardised and widely accepted naming scheme that will allow geologists to interpret terminology in the primary literature and provide formal names for rock samples based on petrographic analyses. It is also supported by a website with downloadable code for chemical classifications.

Igneous and Metamorphic Petrology
Phoscorites and Carbonatites from Mantle to Mine: the Key Example of the Kola Alkaline Province
Tracers to Supercontinent Cycles and Metallogenesis
Kimberlites, Orangeites, and Related Rocks
A Petrographic Atlas

This undergraduate textbook on the key subject of geology closely follows the core curriculum adopted by most universities throughout the world and is a must for every geology student. It covers all aspects of petrology, including not only the
principles of petrology but also applications to the origin, composition, and field relationships of rocks. Although petrology is commonly taught in the junior year, this book is a useful resource for graduate students as well. Featuring over 250 contributions from more than 100 earth scientists from 18 countries, The Encyclopedia of Igneous and Metamorphic Petrology deals with the nature and genesis of igneous rocks that have crystallized from molten magma, and of metamorphic rocks that are the products of re-crystallization associated with increases in temperature and pressure, mainly at considerable depths in the Earth's crust. Entries range from alkaline rocks to zeolite facies - providing information on the mineralogical, chemical and textural characters of rock types, the development of concepts and the present state of knowledge across the spectrum of igneous and metamorphic petrology, together with extensive lists of both commonly used and little used terms and bibliographies. Explores all aspects of LIPs as key processes in shaping our planet, for researchers, graduate students and mining industry professionals.

Plume-lithosphere Interaction
Proceedings of 10th International Kimberlite Conference
Petrology, Geochemistry, Geodynamics
Lamprophyres, Lamproites and Related Rocks
Igneous Petrology

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. For a combined, one-semester, junior/senior-level course in Igneous and Metamorphic Petrology. Also useful for programs that teach Igneous Petrology and Metamorphic Petrology. Typical texts on igneous and metamorphic petrology are geared to either advanced or novice petrology students. This unique text offers comprehensive, up-to-date coverage of both igneous and metamorphic petrology in a single volume—and provides the quantitative and technical background required to critically evaluate igneous and metamorphic phenomena in a way that students at all levels can understand. The goal throughout is for students to be able to apply the techniques—and enjoy the insights of the results—rather than tinker with theory and develop everything from first principles.

This memoir is the first to review all of Antarctica’s volcanism between 200 million years ago and the Present. The region is still volcanically active. The volume is an amalgamation of in-depth syntheses, which are presented within distinctly different tectonic settings. Each is described in terms of (1) the volcanology and eruptive palaeoenvironments; (2) petrology and origin of magma; and (3) active volcanism, including tephrchronochemistry. Important volcanic episodes include: astonishingly voluminous mafic and felsic volcanic deposits associated with the Jurassic break-up of Gondwana; the construction and progressive demise of a major Jurassic to Present continental arc, including back-arc alkaline basalts and volcanism in a young ensialic marginal basin; Miocene to Pleistocene mafic volcanism associated with post-subduction slab-window formation; numerous Neogene alkaline volcanoes, including the massive Erebus volcano and its persistent phonolitic lava lake, that are widely distributed within and adjacent to one of the world’s major zones of lithospheric extension (the West Antarctic Rift System); and very young ultrapotassic volcanism erupted subglacially and forming a worldwide type example (Gaussberg).

Following their recognition by Gumbel (1874), lamprophyres were treated for an entire century as little more than obscure curiosities. Although this situation has changed recently, with a flowering of publications and active workers, lamprophyres remain almost the only group of igneous rocks which have not yet received attention in a dedicated monograph. In five exploratory reviews (1977–1987), the writer aimed to set out what was known about these rocks. The IUGS Subcommission on igneous rock systematics had meanwhile presented its nomenclatural framework (Streckeisen 1979). All this has now been overtaken by a recent explosion of interest, epitomized not least by lamprophyres' greater prominence in the 4th International Kimberlite Conference Proceedings. More data have become available since 1985 than over the entire previous century, and it is obviously impossible for such an extraordinary outpouring to be fully reviewed in this first, preliminary book. At the risk of dissatisfying some readers, therefore, this book concentrates on factual matters, and on a broad overview rather than minutiae. Because not even a world map of known lamprophyres was previously available, almost half the book is deliberately taken up by the first global lamprophyre compilation, and its commensurately extensive Bibliography. Such a compendium of largely objective information is believed to be of more immediate interest and lasting value than a premature pottage of petrogenetic polemic. Chapters 1–7 bring previous studies up to date, and concentrate on factual information.

Introduction to Mineralogy and Petrology
Lamprophyres
Igneous Petrogenesis
Lithospheric Discontinuities
Feldspars, Volume 4A

Igneous and metamorphic petrology has over the last twenty years expanded rapidly into a broad, multifaceted and increasingly quantitative science. Advances in geochemistry, geochronology, and geophysics, as well as the appearance of new analytical tools, have all contributed to new ways of thinking about the origin and evolution of magmas, and the processes driving metamorphism. This book is designed to give students a balanced and comprehensive coverage of these new advances, as well as a firm grounding in the classical aspects of igneous and metamorphic petrology. The emphasis throughout is on the processes controlling petrogenesis, but care is taken to present the important descriptive information so crucial to interpretation. One of the most up-to-date synthesis of igneous and metamorphic petrology available. Emphasis throughout on latest experimental and field data. Igneous and metamorphic sections can be used independently if necessary.

International Kimberlite Conferences (IKCs) are special events that are held across the world once in four to five years. IKC is the confluence platform for academicians, scientists and industrial personnel concerned with diamond exploration and exploitation, petrology, geochemistry, geochronology, geophysics and origin of the primary diamond host rocks and their entrained xenoliths and xenocrysts (including diamond) to get together and deliberate on new advances in research made in the intervening years. Ever since the organization of first IKC in 1973 and its tremendous success, the entire geological world eagerly look forward to subsequent such conferences with great enthusiasm and excitement. The scientific emanations from IKCs continue to make significant impact on our understanding of the composition, nature and evolution of the planet we live on. The previous conferences were held at Cape Town (1973), Santa Fe, New Mexico (1977), Clermont-Ferrand, France, (1982), Perth, Western Australia (1987), Araxa, Brazil (1991), Novosibirsk, Russia (1995), Cape Town (1998), Victoria, Canada (2003) and Frankfurt, Germany (2008). The 10th IKC was held at Bangalore, India between 5th and 11th February 2012. The conference was organized by the Geological Society of India in association with the government organizations, academic institutions and Indian diamond mining companies. About 300 delegates from 36 countries attended the conference and 224 papers were presented. The papers include 78 oral presentations and 146 poster presentations on following topics: Kimberlite geology, origin, evolution and emplacement of kimberlites and related rocks, petrology and geochemistry of metasomatized lithospheric mantle magmas, diamond exploration, cratonic roots, diamonds, diamond mining and sustainable developments and policies and governance of diamond exploration. Pre- and post-conference field trips were organized to (i) the diamond bearing kimberlites of Dharwar Craton in South India, (ii) lamproites of Bundelkhand Craton in northern India and (iii) diamond cutting and polishing industry of Surat, Gujarat in western India. A series of social and cultural programmes depicting cultural diversity of India were organized during the conference. The Kimberlite fraternity enjoyed yet another socially and scientifically successful conference.

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Recommendations of the International Union of Geological Sciences Subcommission on the Systematics of Igneous Rocks
Principles and Practice
Principles of Igneous and Metamorphic Petrology
Metasomatism in Oceanic and Continental Lithospheric Mantle

Petrology

In this book, the first dedicated entirely to the petrology of lamproites and their relationships to other potassium-rich rocks, the objective of the authors is to provide a comprehensive critical review of the occurrence, mineralogy, geochemistry, and petrogenesis of the clan. Although lamproites represent one of the rarest of all rock types, they are both economically and scientifically important and we believe the time is ripe for a review of the advances made in their petrology over the past two decades. Many of these advances stem from the recognition of diamond-bearing lamproites in Western Australia and the reclassification of several anomalous diamond-bearing kimberlites as lamproites. Consequently lamproites, previously of interest only to a small number of mineralogists specializing in exotic outside the mainstream of igneous petrology, have become prime targets for diamond exploration on a worldwide basis. Contemporaneously with these developments, petrologists realized that lamproites possess isotopic signatures complementary to those of midoceanic ridge basalts, alkali basalts, Kimberlites, and other mantle-derived melts. These isotopic studies provided new insights into the long-term development of the mantle by suggesting that the source regions of lamproites were metasomatically enriched in light rare earth and other incompatible elements up to 1-2
Ga prior to the melting events leading to generation of the magma.

Paleoproterozoic to Cenozoic lamprophyres, lamproites and related rock types (e.g., orangeites, kimberlites) are volatile-rich mafic magmatic rocks with a unique potential for the investigation of processes affecting mantle reservoirs. They originated from primary mantle-derived melts that intruded both cratons and off-craton regions, which were parts of former supercontinents – Columbia, Rodinia and Gondwana–Pangea. Well-known for hosting economic minerals and elements such as diamonds, base metals, gold and platinum-group elements, they are also significant for our understanding of deep-mantle processes, such as mantle metasomatism and mantle plume–lithosphere interactions, as well as large-scale geodynamic processes, such as subduction-related tectonics, and supercontinent amalgamation and break-up. This book aims to provide a timely overview of the state-of-the-art and recent advances as achieved by various research groups around the world. Mineralogical, geochemical, geochronological and isotope analyses are used to decipher the complex petrogenesis and metallogenesis of these extraordinary rocks, and unravel a complete history of tectonic events related to individual supercontinent cycles.

A balanced text that bridges the gap between introductory petrography-oriented texts and the more advanced texts that have a thermodynamic and/or chemical approach. Well-indexed, well-referenced and written in a particularly readable style, it leads the reader from classical to modern concepts in igneous petrology.

Rock-forming Minerals

Cenozoic Volcanism in the Mediterranean Area

Igneous Rocks: A Classification and Glossary of Terms

Encyclopedia of Geology

Originally published in 1963, this text provides a major revision of the first edition. It is devoted to the feldspar minerals, incorporating the advances in knowledge and understanding arising from the new and improved techniques for the study of minerals that have developed over the decades between editions. The authors have set out to maintain the general approach used in the other volumes, summarizing important research results and presenting them in an organized fashion.

Potassic igneous rocks have gained much attention among petrologists worldwide, mainly due to their distinct geochemistry, and many geoscientists still consider them as petrological curiosities with an obscure petrogenesis. In the past, a plethora of genetic hypotheses and of local names for potassic igneous rocks from different localities have been created. This has produced some confusion in the literature. This book reviews the geochemical and petrological characteristics of the potassic igneous rock complexes and investigates the different tectonic settings in which these rocks occur. The authors provide an overview and a classification of these rocks and attempt to elucidate the geochemical differences between barren and mineralized potassic igneous complexes. Many epithelial gold and porphyry copper-gold deposits are hosted by high-K rocks. Therefore, this book is not only relevant to academic petrologists working on alkaline rocks, but also to exploration geologists prospecting for epithermal gold and/or porphyry copper-gold deposits in modern and ancient terranes. This third, updated and enlarged edition contains several new sections, new geochemical data and additional references.

The Canadian Shield and adjacent areas underlain by cratonic rocks are a highly prospective geologic environment for diamonds. This volume reviews the genesis of diamonds and the petrology of kimberlites and lamproites, the major diamond-bearing rock types. It then describes diamond exploration techniques, focusing on the use of indicator minerals as a means of identifying prospective areas. Topics covered include major-element geochemistry of indicator minerals, eclogitic paragenesis, and trace element techniques. The volume also discusses the indicator mineral geochemistry results from a study of 18 localities around the world. In addition, since conventional indicator mineral techniques are not always applicable to lamproite exploration, alternative pathfinder minerals are reviewed.

Mantle Metasomatism and Alkaline Magmatism

The Petrology, Mineralogy and Geochemistry of Ellendale 17 Lamproite Pipe, West Kimberley Province, Western Australia


Large Igneous Provinces

Petroleum of Rajmahal Continental Flood Basalts and Associated Lamproites, Northeast India

Encyclopedia of Geology, Second Edition presents six volumes state-of-the-art reviews on the various aspects of geologic research, all of which have moved on considerably since the writing of the first edition. New areas of discussion include extinctions, origins of life, plate tectonics and its influence on faunal provinces, new types of mineral and hydrocarbon deposits, new methods of dating rocks, and geological processes. Users will find this to be a fundamental resource for teachers and students of geology, as well as researchers and non-geology professionals seeking up-to-date reviews of geologic research. Provides a comprehensive and accessible one-stop shop for information on the subject of geology, explaining methodologies and technical jargon used in the field. Highlights connections between geology and other physical and biological sciences, tackling research problems that span multiple fields. Fills a critical gap of information in a field that has seen significant progress in past years. Presents an ideal reference for a wide range of scientists in earth and environmental areas of study.

Twenty years have passed since Menzies & Hawkesworth extended the concept of metasomatism to mantle processes. The aim of this book is to gather together progress made on this topic since then. Most of the 14 papers reported in the volume rely on situs major and trace element analyses of minerals and glasses in mantle xenoliths, and deal with different kinds of metasomatic agents at variable fluid/rock ratios in tectonic settings as different as intra-plate, mid-ocean ridge (ophiolites) and supra-subduction. The book contributes to the wide debate on the nature of the fluids migrating into the mantle wedge, as well as on the different residential times of the subduction signature. In addition, papers on intra-plate settings deal with the problem of relating various metasomatic signatures to one single metasomatic event through an infiltration-reaction process.

Courses more petrogenesis-orientated are im my main objective in writing this book has been to mediately confronted with a basic problem; the review the processes involved in present-day mag ma generation and their relationship to
Read Online Petrology Of Lamproites

Petrology and Genesis of Igneous Rocks comprises of two parts - the first part (Chapters 1 to 8) deals with constituent minerals, texture, thermodynamic principles, phase relations in natural rock systems and causes of diversity in a single petrographic province. Petrology of the crust, mantle and core, the convective cycle patterns in the mantle and their relation to magma genesis and physicochemical properties of magma are also discussed in this part. Use of Isotope geology in determination of age and degree of magma mixing is included towards the end of the first part. The second part (Chapters 9-13) describes individual rock types, from various countries including their geochemistry, petrology and genesis.

Petrology, Structure, Geological Setting, and Metallogeny

Isotope Geochemistry, Petrology, and Source Evaluation of the Leucite Hills Lamproites, Wyoming [microform]

Volcanism in Antarctica: 200 Million Years of Subduction, Rifting and Continental Break-up

Granites