

Geochemical And Mineralogical Characterisation Of Vaalputs

This book compiles research findings directly related to sustainable and economic waste management and resource recovery. Mining wastes and municipal, urban, domestic, industrial and agricultural wastes and effluents—which contain persistent organic contaminants, nanoparticle organic chemicals, nutrients, energy, organic materials, heavy metal, rare earth elements, iron, steel, bauxite, coal and other valuable materials—are significantly responsible for environmental contamination. These low-tenor raw materials, if recycled, can significantly address the demand–supply chain mismatch and process sustainability as a whole while simultaneously decreasing their impacts on human life and biodiversity. This book summarises the large volume of current research in the realm of waste management and resource recovery, which has led to innovation and commercialisation of sustainable and economic waste management for improved environmental safety and improved economics. Key Features: Reviews the key research findings related to sustainable and economic resource recovery and waste management techniques Discusses minimizing waste materials and environmental contaminants with a focus on recovering valuable resources from wastes Examines the potential uses of mining waste in the re-extraction of metals, provision of fuel for power plants, and as a supply of other valuable materials for utilisation/processing Presents research on recycling of municipal, urban, domestic, industrial and agricultural wastes and wastewater in the production and recovery of energy, biogas, fertilizers, organic materials and nutrients Outlines topical research interests resulting in patents and inventions for sustainable and economic waste management techniques and environmental safety

Sampling and Monitoring for the Mine Life Cycle provides an overview of sampling for environmental purposes and monitoring of environmentally relevant variables at mining sites. It focuses on environmental sampling and monitoring of surface water, and also considers groundwater, process water streams, rock, soil, and other media including air and biological organisms. The handbook includes an appendix of technical summaries written by subject-matter experts that describe field measurements, collection methods, and analytical techniques and procedures relevant to environmental sampling and monitoring. The sixth of a series of handbooks on technologies for management of metal mine and metallurgical process drainage, this handbook supplements and enhances current literature and provides an awareness of the critical components and complexities involved in environmental sampling and monitoring at the mine site. It differs from most information sources by providing an approach to address all types of mining influenced water and other sampling media throughout the mine life cycle. Sampling and Monitoring for the Mine Life Cycle is organized into a main text and six appendices that are an integral part of the handbook. Sidebars and illustrations are included to provide additional detail about important concepts, to present examples and brief case studies, and to suggest resources for further information. Extensive references are included.

Environmental Materials and Waste: Resource Recovery and Pollution Prevention contains the latest information on environmental sustainability as a wide variety of natural resources are increasingly being exploited to meet the demands of a worldwide growing population and economy. These raw materials cannot, or can only partially, be substituted by renewable resources within the next few decades. As such, the efficient recovery and processing of mineral and energy resources, as well as recycling such resources, is now of significant importance. The book takes a multidisciplinary approach to fully realize the number of by-products which can be remanufactured, providing the foundation needed across disciplines to tackle this issue. As awareness and opportunities to recover valuable resources from process and bleed streams is gaining interest, sustainable recovery of environmental materials,

including wastewater, offers tremendous opportunity to combine profitable and sustainable production. Presents a state-of-the-art guide to environmental sustainability Provides an overview of the field highlighting recent and emerging issues in environmental resource recovery that cover a wide array of by-products for remanufacture potential Details a multidisciplinary approach to fully realize the number of by-products which can be remanufactured, providing the foundation needed across disciplines to tackle these global issues

Contamination of groundwater with arsenic is being considered a pervasive and critical issue in recent years. Large areas in India, Bangladesh, South East Asia, and other parts of the world are suffering from this problem. Arsenic Removal from Contaminated Groundwater presents a comprehensive discussion on various important issues, including state-of-the-art arsenic removal technologies, preparation and performance analysis of laterite, and scale-up issues and design of a household filter. It also expounds the potentiality of raw laterite and treated laterite as low-cost arsenic adsorbents. The efficiency of adsorbent capacity is evaluated using real arsenic contaminated groundwater collected from an affected area in West Bengal, India. The topic is an emerging area and most of the work presented has the potential of field application.

Hard rock mines have significant effects on the territories where they operate, through both infrastructure construction as well as resource use. Due to their extractive activities, these mines store large quantities of wastes at the surface, which can be both physically and chemically unstable. Reclamation aims to return a mine site to a satisfactory state, meaning that the site should not threaten human health or security, should not generate in the long term any contaminant that could significantly affect the surrounding environment, and should be aesthetically acceptable to communities. This book focuses on the reclamation of waste storage areas, which constitute the main source of pollution during and after mine operations, and especially issues with acid mine drainage and neutral contaminated drainage. Features: Provides fundamental information and describes practical methods to reclaim mine-waste facilities Compares the different methods and illustrates their application at sites through case studies Identifies new reclamation issues and proposes solutions to address them Presents existing and new technologies to reclaim mine waste disposal areas from hard rock mines in different climatic conditions Integrates reclamation into mine operations and long term performance of techniques used through an interdisciplinary approach With mine site reclamation a young and still emerging science, the training needs for professionals and students working in this field are huge. This book is written from an engineering point of view and in it the authors identify new reclamation issues and propose well-tested as well as innovative approaches to addressing them. Students in graduate programs focused on mines and the environment as well as professionals already working in departments related to mine site reclamation will find this book to be a valuable and essential resource.

Metallurgical slags are generated as a by-product of smelting during ironmaking, steelmaking, and the production of ferroalloys and non-ferrous metals. The formation conditions result in complex chemical and mineralogical characteristics unique to slags alone. Historically slags have been discarded as a waste product and, through release of potentially toxic trace elements, represent a hazard to the environment and human health. However, increasingly we are realizing the resource potential of what was previously thought of as waste, thus reducing the environmental impact and taking a step closer to a circular economy. This book is a definitive reference on the environmental geochemistry and resource potential of metallurgical slags by summarizing processes for the generation of slags, describing their chemical and mineralogical characteristics, outlining the fundamental geochemistry that propels slag weathering, and illustrating the utilization of slags. Particular attention is given to the value of slags in modern society as they are widely used as construction materials in civil engineering,

and as an irreplaceable filter in sequestering excess nutrients, pathogens, metal and/or organic contaminants, and even greenhouse gases. The latest developments on recovering residual valuable metals in slags, including new techniques for extracting by-product elements needed for green and frontier technologies, are revealed. This book is essential reading for environmental geochemists, geologists, metallurgists, mining and civil engineers, waste and resource managers, and all those interested and inspired by a circular economy and minimizing our environmental footprint on planet Earth.

The twelve chapters of this volume aim to provide a complete manual for using noble gases in terrestrial geochemistry, covering applications which range from high temperature processes deep in the Earth's interior to tracing climatic variations using noble gases trapped in ice cores, groundwaters and modern sediments. Other chapters cover noble gases in crustal (aqueous, CO₂ and hydrocarbon) fluids and laboratory techniques for determining noble gas solubilities and diffusivities under geologically relevant conditions. Each chapter deals with the fundamentals of the analysis and interpretation of the data, detailing sampling and sampling strategies, techniques for analysis, sources of error and their estimation, including data treatment and data interpretation using recent case studies.

Palaeosurfaces is an area where geologists and geomorphologists can combine their expertise to provide a more holistic treatment of the processes that helped shape the face of the Earth. This volume presents a cross-disciplinary study of the evolution, reconstruction and palaeoenvironmental interpretation of ancient paleosurfaces. Topics include palaeoenvironmental studies involving lateritization and bauxitization, palaeokarstification, geochemistry of rock alteration and the identification of ancient palaeosurface elements in both glaciated and tropical terrains.

During the last decade, software developments in Scanning Electron Microscopy (SEM) provoked a notable increase of applications to the study of solid matter. The mineral liberation analysis (MLA) of processed metal ores was an important drive for innovations that led to QEMSCAN, MLA and other software platforms. These combine the assessment of the backscattered electron (BSE) image to the directed steering of the electron beam for energy dispersive spectroscopy (EDS) to automated mineralogy. However, despite a wide distribution of SEM instruments in material research and industry, the potential of SEM automated mineralogy is still under-utilised. The characterisation of primary ores, and the optimisation of comminution, flotation, mineral concentration and metallurgical processes in the mining industry by generating quantified data, is still the major application field of SEM automated mineralogy. However, there is interesting potential beyond these classical fields of geometallurgy and metal ore fingerprinting. Slags, pottery and artefacts can be studied in an archeological context for the recognition of provenance and trade pathways; soil, and solid particles of all kinds, are objects in forensic science. SEM automated mineralogy allows new insight in the fields of process chemistry and recycling technology.

The role of water in our communities, from local to regional and right up to global levels, poses a series of key questions about climate change, about the anthropogenic impact on the environment, and about all the interconnected actions and events that affect the availability and quality of the resource. All these questions share a common demand for more scientific knowledge and information. In this particular context the disciplinary boundaries are fading, and there is a growing need to create broader connections and wider collaborative interdisciplinary groups, aimed at building an integrated knowledge-base to serve not only stakeholders but also the whole of society. Only in this way can we hope to respond effectively to the challenges and changing dynamics of human-hydrologic systems. Following this concept, contributors from multiple disciplinary backgrounds, such as Law Studies, Hydrogeology, Monitoring and Information Technologies, Geophysics, Geochemistry, Environmental Sciences, Systems Engineering, Economics and Social Studies, joined forces

and interacted in this workshop. The present book reports the proceedings of this three-day ARW (Advanced Research Workshop), and explores different aspects of the environmental security assessment process, focusing on the assessment, monitoring and management of water resources, and giving an overview of the related scientific knowledge.

Clays are increasingly becoming a major problem in the mining, extraction and value-adding processes for a wide range of commodity raw materials. Clays can impact negatively on virtually every unit process within the mining and minerals processing sector, having long-term environmental implications that go well beyond the lifetime of the mining operation. This book is the first to compile, explain and evaluate the effects of clays in the mineral processing value chain, from mining to minerals processing, and finally, tailings disposal. Focusing on topics from the chemistry and rheology of clays to their detection and dissolution behaviour, this book provides comprehensive coverage of the effects on processes such as settling, preg-robing, flotation and comminution. It is an excellent reference for professional mineralogists and geologists, industrial engineers, and researchers interested in clays and clay minerals.

This comprehensive reference on the fundamentals of regolith geoscience describes how regolith is developed from parental rocks and emphasises the importance of chemical, physical, water and biological processes in regolith formation. It provides details for mapping regolith landforms, as well as objective information on applications in mineral exploration and natural resource management. Regolith Science also provides a concise history of weathering through time in Australia. It includes previously unpublished information on elemental abundances in regolith materials along with detailed information on soil degradation processes such as acid sulfate soils. Written by experts in the field, Regolith Science summarises research carried out over a 13-year period within the Cooperative Research Centre for Landscape Environments and Mineral Exploration. This book will be a valuable resource for scientists and graduate/postgraduate students in geology, geography and soil science, professionals in the exploration industry and natural resources management. This paperback edition is a reprint of the original hardback published in October 2008.

Geomaterials derived from the Earth's crust and used in construction after appropriate processing are among the earliest raw materials exploited, processed and used by humans. Their numerous functional properties include accessibility, workability and serviceability, and these are explored within this volume. In modern society, sustainable use of raw materials, specifically those exploited in large volumes such as geomaterials for construction, raises questions of reducing extraction of primary resources and thus minimizing impacts on natural systems, and also employment of materials and technologies to lower emissions of deleterious substances into the atmosphere. This will be possible only if we fully understand the properties, processing and mode of use of traditional geomaterials. Although most of the papers within this volume were written by geologists, the contributions will also be of interest to those working in cultural heritage, monument conservation, civil engineering and architecture.

Geological, geoenvironmental, and resource studies were completed to study a world-class phosphate ore in the Western US Phosphate Field. This integrated, multi-agency, multidisciplinary research emphasized: (1) Geological and geochemical baseline characterization of the deposit and associated rocks, (2) Delineation, assessment, and spatial analysis of phosphate resources and lands disturbed by mining, (3) Contaminant residence, reaction pathways, and environmental fate associated with the occurrence, development, and use of phosphate rock, and (4) Depositional origin and evolution of the Phosphoria Formation and deposit and geoenvironmental modeling.

The ICAMEST 2015 Conference covered new developments in advanced materials and

engineering structural technology. Applications in civil, mechanical, industrial and material science are covered in this book. Providing high-quality, scholarly research, addressing developments, applications and implications in the field of structural health monitoring, construction safety and management, sensors and measurements. This volume contains new models for nonlinear structural analysis and applications of modeling identification. Furthermore, advanced chemical materials are discussed with applications in mechanical and civil engineering and for the maintenance of new materials. In addition, a new system of pressure regulating and water conveyance based on small and middle hydropower stations is discussed. An experimental investigation of the ultimate strength and behavior of the three types of steel tubular K-joints was presented. Furthermore, real-time and frequency linear and nonlinear modeling performance of materials of structures contents were concluded with the notion of a fully brittle material, and this approach is implemented in the book by outlining a finite-element method for the prediction of the construction performance and cracking patterns of arbitrary structural concrete forms. This book is an ideal reference for practicing engineers in material, mechanical and civil engineering and consultants (design, construction, maintenance), and can also be used as a reference for students in mechanical and civil engineering courses.

Environmental Mineralogy and Bio-Geochemistry of Arsenic provides a comprehensive understanding of arsenic geochemistry in the near-surface environment. Topics covered include the mineralogy, thermodynamics, geochemistry, analysis, microbiology, and bioavailability of arsenic, with emphasis on implications for arsenic toxicity, geochemistry in natural ground waters, and mine-associated impacts and possible mitigation options. This volume is useful for those seeking to understand arsenic geochemistry and biological interactions in the near-surface environment, Clay Minerals does not use an online manuscript tracking/submission system. as well those working for mining companies, the chemicals industry, NGO's or government bodies concerned with reducing the impact of arsenic on the environment.

This Special Publication contains 43 scientific studies presented at the 5th conference on 'Clays in natural and engineered barriers for radioactive waste confinement' held in Montpellier, France in 2012. The conference and this resulting volume cover all the aspects of clay characterization and behaviour considered at various temporal and spatial scales relevant to the confinement of radionuclides in clay, from basic phenomenological process descriptions to the global understanding of performance and safety at repository and geological scales. Special emphasis has been given to the modelling of processes occurring at the mineralogical level within the clay barriers. The papers in this Special Publication consider research into argillaceous media under the following topic areas: large-scale geological characterization; clay-based concept/large-scale experiments; hydrodynamical modelling; geochemistry; geomechanics; mass transfer/gas transfer; mass transfer mechanisms. The collection of different topics presented in this Special Publication demonstrates the diversity of geological repository research.

Spoil to Soil: Mine Site Rehabilitation and Revegetation presents both fundamental and practical aspects of remediation and revegetation of mine sites. Through three major themes, it examines characterization of mine site spoils; remediation of chemical, physical and biological constraints of mine site spoils, including post mine-site land-use

practices; and revegetation of remediated mine site spoils. Each theme includes chapters featuring case studies involving mine sites around the world. The final section focuses specifically on case studies with successful mine site rehabilitation. The book provides a narrative of how inert spoil can be converted to live soil. Instructive illustrations show mine sites before and after rehabilitation. The purpose of this book is to provide students, scientists, and professional personnel in the mining industry sensible, science-based information needed to rehabilitate sustainably areas disturbed by mining activities. This book is suitable for undergraduate and graduate students majoring in environmental, earth, and soil sciences; environmental and soil scientists; and mine site environmental engineers and regulators.

Diagenesis is a highly developed, interdisciplinary field of study. It is reciprocal in that it borrows from numerous scientific or technological specialities and then, in turn, repays them with useful results. Too often, however, the information gained and concepts developed remain unintegrated instead of being utilized quickly by several related earth-science fraternities. This volume, the first of a multi-volume work, attempts to bring together such information, thereby assisting the individual and the research group in keeping up with the data explosion. There is no end in sight to diagenetic research because of its wide practical and intellectual appeals. Consequently, periodic reviews, such as presented in this volume, are greatly needed.

"This second edition of Remediation Engineering will continue to be the seminal handbook that regulators must have on-hand to address any of the remediation issues they are grappling with daily. The book is wide-ranging, but specific enough to address any environmental remediation challenge." —Patricia Reyes, Interstate Technology Regulatory Council, Washington, DC, USA

"This book offers the researcher, teacher, practitioner, student, and regulator with state-of-the-art advances in conducting site investigations and remediation for common and emerging contaminants. It is revolutionary in its approach to conducting subsurface investigation, which greatly influences a successful and appropriate response in assessing and addressing environmental risk. This book is a giant leap forward in understanding how contaminants behave and how to reduce risk to acceptable levels in the natural world." —Daniel T. Rogers, Amsted Industries Incorporated, Chicago, Illinois, USA

"This text is a superb reference and a good tool for learning about state-of-the-art techniques in remediation of soil and groundwater. [It] will become a ready reference at many companies as the engineering community creates increased value from remediation efforts around the world." —John Waites, AVX Corporation, Fountain Inn, South Carolina, USA

Remediation Engineering was first published in 1996 and quickly became the go-to reference for a relatively young industry, offering the first comprehensive look at the state-of-the-science in treatment technologies of the time and the contaminants they applied to. This fully updated Second Edition will capture the fundamental advancements that have taken place during the last two decades within all the subdisciplines that form the foundation of the remediation engineering platform. It covers the entire spectrum of current technologies that are employed in the industry and also discusses future trends and how practitioners should anticipate and adapt to those needs. Features: Shares the latest paradigms in remediation design approach and contaminant hydrogeology Presents the landscape of new and emerging contaminants Details the current state of the practice for both conventional technologies, such as sparging and venting Examines newer technologies such as dynamic groundwater recirculation and injection-based remedies to address both organic and inorganic contaminants. Describes the advances in site characterization concepts such as smart investigations and digital conceptual site models. Includes all-new color photographs and figures.

The book "Integrated human exposure to air pollution" aimed to increase knowledge about human exposure in different micro-environments, or when citizens are performing specific

tasks, to demonstrate methodologies for the understanding of pollution sources and their impact on indoor and ambient air quality, and, ultimately, to identify the most effective mitigation measures to decrease human exposure and protect public health. Taking advantage of the latest available tools, such as internet of things (IoT), low-cost sensors and a wide access to online platforms and apps by the citizens, new methodologies and approaches can be implemented to understand which factors can influence human exposure to air pollution. This knowledge, when made available to the citizens, along with the awareness of the impact of air pollution on human life and earth systems, can empower them to act, individually or collectively, to promote behavioral changes aiming to reduce pollutants' emissions. Overall, this book gathers fourteen innovative studies that provide new insights regarding these important topics within the scope of human exposure to air pollution. A total of five main areas were discussed and explored within this book and, hopefully, can contribute to the advance of knowledge in this field.

Recent developments have provided the opportunity to recover valuable materials from AMD treatment; this is a sustainable approach that allows to reduce waste while generating incomes that balance the cost of the treatment. This book provides insights to innovative and affordable routes for AMD valorisation that can certainly motivate the mining industry to effectively manage their wastes and minimize environmental impact while generating jobs opportunities. This special volume offers a snapshot of the latest developments in mineral exploration, in particular, geophysical, geochemical, and computational methods. It reflects the cutting-edge applications of geophysics and geochemistry, as well as novel technologies, such as in artificial intelligence and hyperspectral exploration, methods that have profoundly changed how exploration is conducted. This special volume is a representation of these cutting-edge and pioneering methods to consider and conduct exploration, and should serve both as a valuable compendium of the most innovative exploration methodologies available and as a foreshadowing of the form of future exploration. As such, this volume is of significant importance and would be useful to any exploration geologist and company

Geochemistry at the surface of the earth is dominated by two somewhat antagonistic forces: chemical reactions which attempt to attain a steady state (equilibrium) and geological movement of materials in time and space which changes the parameters that control chemical equilibrium. Another aspect that is extremely important to earth surface geochemistry is the effect of plants on the chemical and physical stability of materials (soils). Plant systems in fact work against the normal chemical changes (loss of silica, potassium, etc.) and the normal physical changes (stabilizing fine grained materials (clays) in the surface zones to avoid erosion). Biological effects are clearly seen in redox effects in the various parts of the earth surface movement cycle; soil formation, stream transport, sedimentation. This book attempts to outline these different parameters and their interactions as they affect earth surface geochemistry in order to give a better understanding of movement and accumulation of elements at the surface of the earth.

Sediments are a natural part of aquatic systems and they are essential for the hydrological, geomorphological and ecological functioning of those systems. For society they are important and represent an important resource. However, due to the ever increasing use of river catchments, sediments need to be managed in a balanced and sustainable way. Sediment Management at the River Basin Scale reviews some of the key requirements and challenges facing scientists, river basin managers, and policy makers for sustainable sediment management at the river basin scale, and puts forward important recommendations. This volume also available as part of a 4-volume set, ISBN 0444519599. Discount price for set purchase. * First book to consider management at the basin scale * State-of-the-art review chapters * New conceptual frameworks and approaches to management

Leaching is a primary extractive operation in hydrometallurgical processing, by which a metal

of interest is transferred from naturally occurring minerals into an aqueous solution. In essence, it involves the selective dissolution of valuable minerals, where the ore, concentrate, or matte is brought into contact with an active chemical solution known as a leach solution. Currently, the hydrometallurgical processes have a great number of applications, not only in the mining sector—in particular, for the recovery of precious metals—but also in the environmental sector, for the recovery of toxic metals from wastes of various types, and their reuse as valuable metals, after purification. Therefore, there is an increasing need to develop novel solutions, to implement environmentally sustainable practices in the recovery of these valuable and precious metals, with particular reference to critical metals; those included in materials that are indispensable to modern life and for which an exponential increase in consumption is already a reality, or will be in a short-term perspective. For publication in this Special Issue, consideration has been given to articles that contribute to the optimization of the kinetic conditions of innovative hydrometallurgical processes—economic and of low environmental impact—applied to the recovery of valuable and critical metals.

The considerable exploration success achieved by geochemistry over the last several decades - and still continuing - has provided both the basis and rationale for the Handbook of Exploration Geochemistry series, including Volume 6, Drainage Geochemistry in Mineral Exploration. With contributions from 25 experts of truly global professional experience in drainage geochemistry, this book is a thorough appraisal of the state of the art in the use of surface and sub-surface waters, stream and lake sediments, heavy minerals for mineral exploration in tropical rain forests, temperate glaciated terrains, mountain chains, arid deserts and regions of agricultural and industrial pollution. Additional attention is given to gold and uranium exploration, and to the growing role of drainage geochemistry as a multi-purpose environmental mapping technique with applications in human health studies, ore deposit modelling and pollution monitoring. It comprises 16 chapters, more than 250 figures and a bibliography of some 1600 references. This book is the most extensive and detailed single work on the principles and applications of drainage geochemistry in mineral exploration blending both theoretical considerations and practical implementations.

Multidisciplinary treatment of the urgent issues surrounding urban pollution worldwide Written by some of the top experts on the subject in the world, this book presents the diverse, complex and current themes of the urban pollution debate across the built environment, urban development and management continuum. It uniquely combines the science of urban pollution with associated policy that seeks to control it, and includes a comprehensive collection of international case studies showing the status of the problem worldwide. Urban Pollution: Science and Management is a multifaceted collection of chapters that address the contemporary concomitant issues of increasing urban living and associated issues with contamination by offering solutions specifically for the built environment. It covers: the impacts of urban pollution; historical urban pollution; evolution of air quality policy and management in urban areas; ground gases in urban environments; bioaccessibility of trace elements in urban environments; urban wastewater collection, treatment, and disposal; living green roofs; light pollution; river ecology; greywater recycling and reuse; containment of pollution from urban waste disposal sites; bioremediation in urban pollution mitigation; air quality monitoring; urban pollution in China and India; urban planning in sub-Saharan Africa and more. Deals with both the science and the relevant policy and management issues Examines the main sources of urban pollution Covers both first-world and developing world urban pollution issues Integrates the latest scientific research with practical case studies Deals with both legacy and emerging pollutants and their effects The integration of physical and environmental sciences, combined with social, economic and political sciences and the use of case studies makes Urban Pollution: Science and Management an incredibly useful resource for policy experts, scientists, engineers and those interested in the subject.

It is internationally accepted that the safest and most sustainable option for managing radioactive waste is geological disposal, utilizing both engineering and geology to isolate the waste and contain the radioactivity. This Special Publication contains 25 scientific studies presented at the 6th conference on 'Clays in natural and engineered barriers for radioactive waste confinement' held in Brussels, Belgium in 2015. The conference and this resulting volume cover many of the aspects of clay characterization and behaviour considered at various temporal and spatial scales relevant to the confinement of radionuclides in clay, from basic phenomenological process descriptions to the global understanding of performance and safety at repository and geological scales. The papers in this volume consider research into argillaceous media under the following topic areas: large-scale geological characterization; general strategy for clay-based disposal systems; geomechanics; mass transfer; bentonite evolution and gas transfer. The collection of different topics presented in this Special Publication demonstrates the diversity of geological repository research.

This volume 1 and its companion volume 2 present the results of new investigations into the geology, paleontology and paleoecology of the early hominin site of Laetoli in northern Tanzania. The site is one of the most important paleontological and paleoanthropological sites in Africa, worldrenowned for the discovery of fossils of the early hominin *Australopithecus afarensis*, as well as remarkable trails of its footprints. The first volume provides new evidence on the geology, geochronology, ecology, ecomorphology and taphonomy of the site. The second volume describes newly discovered fossil hominins from Laetoli, belonging to *Australopithecus afarensis* and *Paranthropus aethiopicus*, and presents detailed information on the systematics and paleobiology of the diverse associated fauna. Together, these contributions provide one of the most comprehensive accounts of a fossil hominin site, and they offer important new insights into the early stages of human evolution and its context.

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