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Geopolymer Chemistry and Applications-Joseph Davidovits 2008 What can be done about the major concerns of our Global Economy on energy, global warming, sustainable development, user-friendly processes, and green chemistry? Here is an important contribution to the mastering of these phenomena today. Written by Joseph Davidovits, the inventor and founder of geopolymer science, it is an introduction to the subject for the newcomers, students, engineers and professionals. You will find science, chemistry, formulas and very practical information (including patents' excerpts) covering: - The mineral polymer concept: silicones and geopolymers, - Macromolecular structure of natural silicates and aluminosilicates, - Scientific Tools, X-rays, FTIR, NMR, - The synthesis of mineral geopolymers, Poly(siloxonate) and polysilicate, soluble silicate, Chemistry of (Na, K)oligo-sialates: hydrous alumino-silicate gels and zeolites, Kaolinite / Hydrosodalite-based geopolymer, Metakaolin MK-750-based geopolymer, Calcium-based geopolymer, Rock-based geopolymer, Silica-based geopolymer, Fly ash-based geopolymer, Phosphate-based geopolymer, Organic-mineral geopolymer, - Properties: physical, chemical and long-term durability, - Applications: Quality controls, Development of user-friendly systems, Castable geopolymer, industrial and decorative applications, Geopolymer / fiber composites, Foamed geopolymer, Geopolymers in ceramic processing, Manufacture of geopolymer cement, Geopolymer concrete, Geopolymers in toxic and radioactive waste management. It is a textbook, a reference book instead of being a collection of scientific papers. Each chapter is followed by a bibliography of the relevant published literature including 75 patents, 120 tables, 360 figures, 550references, 700 authors cited, representing the most up to date contributions of the scientific community. The industrial applications of geopolymers with engineering procedures and design of processes are also covered in this book.

Geopolymer Chemistry and Applications, 5th Ed-Joseph Davidovits 2020-02-27 Written by Joseph Davidovits, the inventor and founder of geopolymer science, Geopolymer Chemistry and Applications is an introduction to the subject for the newcomers, students, engineers and professionals. You will find science, chemistry, formulas and very practical information.

Geopolymers: The route to eliminate waste and emissions in ceramic and cement manufacturing-ICe rS

Fire-Resistant Geopolymers-Les Vickers 2014-12-05 The book covers the topic of geopolymers, in particular it highlights the relationship between structural differences as a result of variations during the geopolymer synthesis and its physical and chemical properties. In particular, the book describes the optimization of the thermal properties of geopolymers by adding micro-structural modifiers such as fibres and/or fillers into the geopolymer matrix. The range of fibres and fillers used in geopolymers, their impact on the microstructure and thermal properties is described in great detail. The book content will appeal to researchers, scientists, or engineers who are interested in geopolymer science and technology and its industrial applications.

Design, Development, and Applications of Structural Ceramics, Composites, and Nanomaterials-Dileep Singh 2014-02-19 Contains a collection of papers from the below symposia heldduring the 10th Pacific Rim Conference on Ceramic and GlassTechnology (PacRim10), June 2-7, 2013, in Coronado, California2012: Engineering Ceramics and Ceramic Matrix Composites: Design,Development, and Application Advanced Ceramic Coatings: Processing, Properties, andApplication Geopolymers – Low Energy, Environmentally Friendly,Inorganic Polymeric Ceramic Multifunctional Metal Oxide Nanostructures andHeteroarchitectures for Energy and Device Application Advanced Characterization and Modeling of CeramicInterfaces

Proceedings of the 41st International Conference on Advanced Ceramics and Composites-Narottam P. Bansal 2018-01-18 This proceedings contains a collection of 24 papers from The American Ceramic Society’s 41st International Conference on Advanced Ceramics and Composites, held in Daytona Beach, Florida, January 22-27, 2017. This issue includes papers presented in the following symposia: • Symposium 3 14th International Symposium on Solid Oxide Fuel Cells (SOFC) • Symposium 8 11th International Symposium on Advanced Processing & Manufacturing Technologies for Structural & Multifunctional Materials and Systems • Symposium 11 Advanced Materials and Innovative Processing ideas for the Production Root Technology • Symposium 12 Materials for Extreme Environments: Ultrahigh Temperature Ceramics (UHTCs) and Nano-laminated Ternary Carbides and Nitrides (MAX Phases) • Symposium 13 Advanced Materials for Sustainable Nuclear Fission and Fusion Energy • Symposium 14 Crystalline Materials for Electrical, Optical and Medical Applications • Symposium 15 Additive Manufacturing and 3D Printing Technologies • Focused Session 1 Geopolymers, Chemically Bonded Ceramics, Eco-friendly and Sustainable Materials

Handbook of Alkali-Activated Cements, Mortars and Concretes-Fernando Pacheco-Torgal 2014-11-20 This book provides an updated state-of-the-art review on new developments in alkali-activation. The main binder of concrete, Portland cement, represents almost 80% of the total CO2 emissions of concrete which are about 6 to 7% of the Planet’s total CO2 emissions. This is particularly serious in the current context of climate change and it could get even worse because the demand for Portland cement is expected to increase by almost 200% by 2050 from 2010 levels, reaching 6000 million tons/year. Alkali-activated binders represent an alternative to Portland cement having higher durability and a lower CO2 footprint. Reviews the chemistry, mix design, manufacture and properties of alkali-activated cement-based concrete binders Considers performance in adverse environmental conditions. Offers equal emphasis on the science behind the technology and its use in civil engineering.

Advanced Composites for Aerospace, Marine, and Land Applications-Tomoko Sano 2016-11-30 The papers in this volume cover a broad spectrum of topics that represent the truly diverse nature of the field of composite materials. This collection presents research and findings relevant to the latest advances in composites materials, specifically their use in aerospace, maritime, and even land applications. The editors have made every effort to bring together authors who put forth recent advances in their research while concurrently both elaborating on and thereby enhancing our prevailing understanding of the salient aspects related to the science, engineering, and far-reaching technological applications of composite materials.

CIGOS 2019, Innovation for Sustainable Infrastructure-Cuong Ha-Minh 2019-10-10 This book presents selected articles from the 5th International Conference on Geotechnics, Civil Engineering Works and Structures, held in Ha Noi, focusing on the theme “Innovation for Sustainable Infrastructure”, aiming to not only raise awareness of the vital importance of sustainability in infrastructure development but to also highlight the essential roles of innovation and technology in planning and building sustainable infrastructure. It provides an international platform for researchers, practitioners, policymakers and entrepreneurs to present their recent advances and to exchange knowledge and experience on various topics related to the theme of “Innovation for Sustainable Infrastructure”.

Geopolymers-J L Provis 2009-06-22 A geopolymer is a solid aluminosilicate material usually formed by alkali hydroxide or alkali silicate activation of a solid precursor such as coal fly ash, calcined clay and/or metallurgical slag. Today the primary application of geopolymer technology is in the development of reduced-CO2 construction materials as an alternative to Portland-based cements. Geopolymers: structure, processing, properties and industrial applications reviews the latest research on and applications of these highly important materials. Part one discusses the synthesis and characterisation of geopolymers with chapters on topics such as fly ash chemistry and inorganic polymer cements, geopolymer precursor design, nanostructure/microstructure of metakaolin and fly ash geopolymers, and geopolymer synthesis kinetics. Part two reviews the manufacture and properties of geopolymers including accelerated ageing of geopolymers, chemical durability, engineering properties of geopolymer concrete, producing fire and heat-resistant geopolymers, utilisation of mining wastes and thermal properties of geopolymers. Part three covers applications of geopolymers with coverage of topics such as commercialisation of geopolymers for construction, as well as applications in waste management. With its distinguished editors and international team of contributors, Geopolymers: structure, processing, properties and industrial applications is a standard reference for scientists and engineers in industry and the academic sector, including practitioners in the cement and concrete industry as well as those involved in waste reduction and disposal. Discusses the synthesis and characterisation of geopolymers with chapters covering fly ash chemistry and inorganic polymer cements Assesses the application and commercialisation of geopolymers with particular focus on applications in waste management Reviews the latest research on and applications of these highly important materials

An Introduction to Nuclear Waste Immobilisation-Michael I Ojovan 2013-12-03 Drawing on the authors’ extensive experience in the processing and disposal of waste, An Introduction to Nuclear Waste Immobilisation, Second Edition examines the gamut of nuclear waste issues from the natural level of radionuclides in the environment to geological disposal of waste-forms and their long-term behavior. It covers all-important aspects of processing and immobilization, including nuclear decay, regulations, new technologies and methods. Significant focus is given to the analysis of the various matrices used, especially cement and glass, with further discussion of other matrices such as bitumen. The final chapter concentrates on the performance assessment of immobilizing materials and safety of disposal, providing a full range of the resources needed to understand and correctly immobilize nuclear waste. The fully revised second edition focuses on core technologies and has an integrated approach to immobilization and hazards Each chapter focuses on a different matrix used in nuclear waste immobilization: cement, bitumen, glass and new materials Keeps the most important issues surrounding nuclear waste - such as treatment schemes and technologies and disposal - at the forefront

Calcined Clays for Sustainable Concrete-Karen Scrivener 2015-06-07 This volume focuses on research and practical issues linked to Calcined Clays for Sustainable Concrete. The main subjects are geology of clays, hydration and performance of blended system with calcined clays, alkali activated binders, economic and environmental impacts of the use of calcined clays in cement based materials. Topics addressed in this book include the influence of processing on reactivity of calcined clays, influence of clay mineralogy on reactivity, geology of clay deposits, Portland-calcined clay systems, hydration, durability, performance, Portland-calcined clay-limestone systems, hydration, durability, performance, calcined clay-alkali systems, life cycle analysis, economics and environmental impact of use of calcined clays in cement and concrete and field applications. This book compiles the different contributions of the 1st International Conference on Calcined Clays for Sustainable Concrete, which took place in Lausanne, Switzerland, June, 23-25, 2015.The papers present the latest research in their field. It contains nearly 80 papers and abstracts. Overall, this work gives a broad view of research on calcined clays in the field of construction and will stimulate further research into calcined clays for sustainable concrete.

Cement-Based Materials for Nuclear Waste Storage-Florence Bart 2012-08-16 As the re-emergence of nuclear power as an acceptable energy source on an international basis continues, the need for safe and reliable ways to dispose of radioactive waste becomes ever more critical. The ultimate goal for designing a predisposal waste-management system depends on producing waste containers suitable for storage, transportation and permanent disposal. Cement-Based Materials for Nuclear-Waste Storage provides a roadmap for the use of cementation as an applied technique for the treatment of low- and intermediate-level radioactive wastes. Coverage includes, but is not limited to, a comparison of cementation with other solidification techniques, advantages of calcium-silicate cements over other materials and a discussion of the long-term suitability and safety of waste packages as well as cement barriers.

Advances in Structural Engineering-Vasant Matsagar 2014-12-12 The book presents research papers presented by academicians, researchers, and practicing structural engineers from India and abroad in the recently held Structural Engineering Convention (SEC) 2014 at Indian Institute of Technology Delhi during 22 - 24 December 2014. The book is divided into three volumes and encompasses multidisciplinary areas within structural engineering, such as earthquake engineering and structural dynamics, structural mechanics, finite element methods, structural vibration control, advanced cementitious and composite materials, bridge engineering, and soil-structure interaction. Advances in Structural Engineering is a useful reference material for structural engineering fraternity including undergraduate and postgraduate students, academicians, researchers and practicing engineers.

Geopolymer, Green Chemistry and Sustainable Development Solutions-Joseph Davidovits 2005

Exploring Chemistry with Electronic Structure Methods-James B. Foresman 1996

Alkali-Activated Cements and Concretes-Caijun Shi 2006-05-10 The first English-language book which reviews and summarizes worldwide research advances in alkali-activated cements and concrete. Essential topics include: raw materials and their properties for the production of the two new types of binder the hydration and microstructure development of alkali-activated slag cements the mechanical properties and durability of alkali-activated slag cement and concrete other various cementing systems and their applications related standards and specifications. This respected team of authors has produced an important piece of research that will be of great interest to professionals and academics alike, enabling the production of more durable and environmentally sensitive materials.

Rheology and Processing of Construction Materials-Viktor Mechtcherine 2019-08-24 This book gathers the peer-reviewed contributions presented at two parallel, closely interconnected events on advanced construction materials and processes, namely the 2nd International RILEM Conference on Rheology and Processing of Construction Materials (RheoCon2) and the 9th International RILEM Symposium on Self-Compacting Concrete (SCC9), held in Dresden, Germany on 8-11 September 2019. The papers discuss various aspects of research on the development, testing, and applications of cement-based and other building materials together with their specific rheological properties. Furthermore, the papers cover the latest findings in the fast-growing field of self-compacting concrete, addressing topics including components’ properties and characterization; chemical admixtures, effect of binders (incl. geopolymers, calcined clay, etc.) and mixture design; laboratory and in-situ rheological testing; constitutive models and flow modelling; numerical simulations; mixing, processing and casting processes; and additive manufacturing / 3D-printing. Also presenting case studies, the book is of interest to researchers, graduate students, and industry specialists, such as material suppliers, consultants and construction experts.

Sustainable Construction and Building Materials-Bibhuti Bhusan Das 2018-12-30 This book presents select proceedings of the International Conference on Sustainable Construction and Building Materials (ICSCBM 2018), and examines a range of durable, energy-efficient, and next-generation construction and building materials produced from industrial wastes and byproducts. The topics covered include alternative, eco-friendly construction and building materials, next-generation concretes, energy efficiency in construction, and sustainability in construction project management. The book also discusses various properties and performance attributes of modern-age concretes including their durability, workability, and carbon footprint. As such, it offers a valuable reference for beginners, researchers, and professionals interested in sustainable construction and allied fields.

Factories of the Future-Tullio Tolio 2019-02-14 This book is open access under a CC BY 4.0 license.This book presents results relevant in the manufacturing research field, that are mainly aimed at closing the gap between the academic investigation and the industrial application, in collaboration with manufacturing companies. Several hardware and software prototypes represent the key outcome of the scientific contributions that can be grouped into five main areas, representing different perspectives of the factory domain:1) Evolutionary and reconfigurable factories to cope with dynamic production contexts characterized by evolving demand and technologies, products and processes.2) Factories for sustainable production, asking for energy efficiency, low environmental impact products and processes, new de-production logics, sustainable logistics.3) Factories for the People who need new kinds of interactions between production processes, machines, and human beings to offer a more comfortable and stimulating working environment.4) Factories for customized products that will be more and more tailored to the final user’s needs and sold at cost-effective prices.5) High performance factories to yield the due production while minimizing the inefficiencies caused by failures, management problems, maintenance.This books is primarily targeted to academic researchers and industrial practitioners in the manufacturing domain.

Chemically Bonded Phosphate Ceramics-Arun S. Wagh 2016-05-17 This book brings together the latest developments in chemically bonded phosphate ceramics (CBPCs), including several novel ceramics, from US Federal Laboratories such as Argonne, Oak Ridge, and Brookhaven National Laboratories, as well as Russian and Ukrainian nuclear institutes. Coupled with further advances in their use as biomaterials, these materials have found uses in diverse fields in recent years. Applications range from advanced structural materials to corrosion and fire protection coatings, oil-well cements, stabilization and encapsulation of hazardous and radioactive waste, nuclear radiation shielding materials, and products designed for safe storage of nuclear materials. Such developments call for a single source to cover their science and applications. This book is a unique and comprehensive source to fulfil that need. In the second edition, the author covers the latest developments in nuclear waste containment and introduces new products and applications in areas such as biomedical implants, cements and coatings used in oil-well and other petrochemical applications, and flame-retardant anti-corrosion coatings. Explores the key applications of CBPCs including nuclear waste storage, oil-well cements, anticorrosion coatings and biomedical implants Demystifies the chemistry, processes and production methods of CBPCs Draws on 40 years of developments and applications in the field, including the latest developments from USA, Europe, Ukraine, Russia, China and India

Advances in Natural Fibre Composites-Raul Figueiro 2017-10-24 This book presents selected high-quality research papers submitted to ICNF 2017, the 3rd International Conference on Natural Fibers, which was held in Braga, Portugal, on 21–23 June 2017. It discusses the latest research and developments in the field and covers a wide range of topics related to various aspects of natural-fiber composites, such as production and processing of raw materials, surface modification and functionalization, advanced fibrous structures for composites, nano fibers, experimental characterization, modeling and analysis, design and product development, applications, market potential,

and environmental impacts. The book presents the latest research work addressing different approaches and techniques to improve processing, performance, functionalities and cost-effectiveness of natural-fibers composites, in order to increase their applications in different industrial sectors such as automobiles, transportation, construction, and sport. &nbsp;

International Congress on Polymers in Concrete (ICPIC 2018)-Mahmoud M. Reda Taha 2018-04-06 This volume collects the proceedings from the International Congress of Polymers in Concrete 2018 (ICPIC), held under the theme “Polymers for Resilient and Sustainable Concrete Infrastructure.” ICPIC 2018 provides an opportunity for researchers and specialists working in the fields of polymers to exchange ideas and follow the latest progress in the use of polymers in concrete infrastructure. It also showcases the use of polymers and polymer concrete in sustainable and resilient development, and provides a platform for local and overseas suppliers, developers, manufacturers and contractors using polymers, polymer concrete and polymer composites in concrete structures to develop new business opportunities and follow the latest developments in the field. The International Congress of Polymers in Concrete is an international forum that has taken place every three years for the last 40 years with the objective of following progress in the field of polymers and their use in concrete and construction. Following 15 successful congresses held in London (1975), Austin (1978), Koriyama (1981), Darmstadt (1984), Brighton (1987), Shanghai (1990), Moscow (1992), Oostende (1995), Bologna (1998), Honolulu (2001), Berlin (2004), Chuncheon (2007), Funchal (2010), Shanghai (2013) and Singapore (2015), the 16th ICPIC will take place in Washington, DC, from April 29 to May 1st, 2018.

Calcined Clays for Sustainable Concrete-Shashank Bishnoi 2020-04-13 This volume comprises the proceedings of the Third International Conference on Calcined Clays for Sustainable Concrete held in New Delhi, India in October 2019. The papers cover topics related to geology of clay, hydration and performance of blended systems with calcined clays, alkali activated binders, and economic and environmental impacts of the use of calcined clays in cement-based materials. The book presents research on influence of processing on reactivity of calcined clays, influence of clay mineralogy on reactivity, geology of clay deposits, and the environmental impact of use of calcined clays in cement and concrete and field applications of calcined clay in concrete. Apart from giving an overview of the progress of research during the last two years, this work also covers the state-of-the art on the practical aspects of production and use of calcined clays in construction. The contents of this volume will prove useful to researchers and graduate students working in the areas of cement chemistry, cement production, and concrete design.

Chemical Biomarkers in Aquatic Ecosystems-Thomas S. Bianchi 2011-02-28 This textbook provides a unique and thorough look at the application of chemical biomarkers to aquatic ecosystems. Defining a chemical biomarker as a compound that can be linked to particular sources of organic matter identified in the sediment record, the book indicates that the application of these biomarkers for an understanding of aquatic ecosystems consists of a biogeochemical approach that has been quite successful but underused. This book offers a wide-ranging guide to the broad diversity of these chemical biomarkers, is the first to be structured around the compounds themselves, and examines them in a connected and comprehensive way. This timely book is appropriate for advanced undergraduate and graduate students seeking training in this area; researchers in biochemistry, organic geochemistry, and biogeochemistry; researchers working on aspects of organic cycling in aquatic ecosystems; and paleoceanographers, petroleum geologists, and ecologists. Provides a guide to the broad diversity of chemical biomarkers in aquatic environments The first textbook to be structured around the compounds themselves Describes the structure, biochemical synthesis, analysis, and reactivity of each class of biomarkers Offers a selection of relevant applications to aquatic systems, including lakes, rivers, estuaries, oceans, and paleoenvironments Demonstrates the utility of using organic molecules as tracers of processes occurring in aquatic ecosystems, both modern and ancient

Heavy Metals-Hosam El-Din M. Saleh 2018-06-27 Fundamental societal changes resulted from the necessity of people to get organized in mining, transporting, processing, and circulating the heavy metals and their follow-up products, which in consequence resulted in a differentiation of society into diversified professions and even societal strata. Heavy metals are highly demanded technological materials, which drive welfare and progress of the human society, and often play essential metabolic roles. However, their eminent toxicity challenges the field of chemistry, physics, engineering, cleaner production, electronics, metabolomics, botany, biotechnology, and microbiology in an interdisciplinary and cross-sectorial manner. Today, all these scientific disciplines are called to dedicate their efforts in a synergistic way to avoid exposure of heavy metals into the eco- and biosphere, to reliably monitor and quantify heavy metal contamination, and to foster the development of novel strategies to remediate damage caused by heavy metals.

Decision Based Design-Vijitashwa Pandey 2013-08-26 In a presentation that formalizes what makes up decision based design, Decision Based Design defines the major concepts that go into product realization. It presents all major concepts in design decision making in an integrated way and covers the fundamentals of decision analysis in engineering design. It also trains engineers to understand the impacts of design decision. The author teaches concepts in demand modeling and customer preference modeling and provides examples. This book teaches most fundamental concepts encountered in engineering design like: concept generation, multiattribute decision analysis, reliability engineering, design optimization, simulation, and demand modeling. The book provides the tools engineering practitioners and researchers need to first understand that engineering design is best viewed as a sequence of decisions made by the stakeholders involved and then apply the decision based design concepts in practice. It teaches fundamental concepts encountered in engineering design, such as concept generation, multiattribute decision analysis, reliability engineering, design optimization, simulation, and demand modeling. This book helps students and practitioners understand that there is a rigorous way to analyze engineering decisions taking into consideration all the potential technical and business impacts of their decisions. It can be used in its entirety to teach a course in decision based design, while selected chapters can also be used to cover courses in subdisciplines that make up decision based design.

Alkali Activated Materials-John L. Provis 2013-11-19 This is a State of the Art Report resulting from the work of RILEM Technical Committee 224-AAM in the period 2007-2013. The Report summarises research to date in the area of alkali-activated binders and concretes, with a particular focus on the following areas: binder design and characterisation, durability testing, commercialisation, standardisation, and providing a historical context for this rapidly-growing research field.

They Built the Pyramids-Joseph Davidovits 2008-05-20 Joseph Davidovits explains the intriguing theory that made him famous. He shows how the Pyramids were built by using re-agglomerated stone (a natural limestone treated like a concrete), and not with huge carved blocks, hauled on fragile ramps. Archaeology bears him out, as well as hieroglyphic texts, scientific analysis, religious and historical facts. The author sweeps aside the conventional image which cripples Egyptology and delivers a captivating and surprising view of this civilisation; the first complete presentation on how the pyramids were built. The revelations are sensational, especially when he explains why the pharaohs stopped building great pyramids because of an over-exploitation of raw materials and a likely environmental disaster. He charts the rise of this technology, its apogee at Giza, and the decline. Everything is logical, everything fits into place.

Strain-Hardening Cement-Based Composites-Viktor Mechtcherine 2017-09-04 This is the proceedings of the 4th International Conference on Strain-Hardening Cement-Based Composites (SHCC4), that was held at the Technische Universität Dresden, Germany from 18 to 20 September 2017. The conference focused on advanced fiber-reinforced concrete materials such as strain-hardening cement-based composites (SHCC), textile-reinforced concrete (TRC) and high-performance fiber-reinforced cement-based composites (HPFRCC). All these new materials exhibit pseudo-ductile behavior resulting from the formation of multiple, fine cracks when subject to tensile loading. The use of such types of fiber-reinforced concrete could revolutionize the planning, development, dimensioning, structural and architectural design, construction of new and strengthening and repair of existing buildings and structures in many areas of application. The SHCC4 Conference was the follow-up of three previous successful international events in Stellenbosch, South Africa in 2009, Rio de Janeiro, Brazil in 2011, and Dordrecht, The Netherlands in 2014.

Green Chemistry-Suresh C. Ameta 2013-09-11 This book highlights the potential and scope of green chemistry for clean and sustainable development. Covering the basics, the book introduces readers to the need and the many applications and benefits and advantages of environmentally friendly chemical practice and application in industry. The book addresses such topics as ecologically safe products, catalysts and solvents, conditions needed to produce such products, types of chemical processes that are conducive to green chemistry, and much more.

Proceedings of the International Conference of Sustainable Production and Use of Cement and Concrete-Jose Fernando Martirena-Hernandez 2019-06-21 This volume gathers the latest advances, innovations and applications presented by leading international researchers and engineers at the International Conference on Sustainable Production and Use of Cement and Concrete (ICSPCC 2019), held in Villa Clara, Cuba on June 23-30, 2019. It covers highly diverse topics, including sustainable production of low-carbon cements, novelties in the development of supplementary cementitious materials, new techniques for the microstructural characterization of construction materials, Portland-based and alkaline-activated cementitious systems, development of additives and additions in the sustainable production of concrete, sustainable production of high-performance concrete, durable concrete produced with recycled aggregates, development of mortars for historical patrimony restoration, environmental and economic assessment of the production and use of cement. The contributions, which were selected by means of a rigorous, international peer-review process, highlight numerous exciting ideas that will inspire novel research directions and foster multidisciplinary collaboration between different specialists.

Comprehensive Composite Materials II-Carl H. Zweben 2017-09-01 Comprehensive Composite Materials II, Second Edition is a one-stop reference work spanning the whole composites science field, covering such topics as fiber reinforcements and general theory of composites, polymer matrix composites, metal matrix composites, test methods, nondestructive evaluation and smart composites, design and application, and nanocomposites, multifunctional materials and smart materials. Detailed coverage is also given to the development and application of the principles of multi-scale mechanics and physical model-based design methods and the incorporation of mechanisms of deformation and fracture into predictive design equations that are useful for the design engineer. Extensive coverage of topics related to nanocomposites, including nanoscale reinforcements, such as single-wall and multi-wall nanotubes, graphene nanoplatelets, and nanodiamonds are also covered. Includes up-to-date coverage of important commercial, consumer and aerospace/defense applications, including structural, mechanical, electronic, and medical uses of composites Covers new technologies with a special focus on nanocomposites and multifunctional materials, important for many areas, including structures and electronics Contains approximately 85% newly commissioned articles, with 15% of articles updated from the previous edition

Advances in Structural Engineering-K. V. L. Subramaniam 2020-05-13 This book contains selected papers in the area of structural engineering from the proceedings of the conference, Futuristic Approaches in Civil Engineering (FACE) 2019. In the area of construction materials, the book covers high quality research papers on raw materials and manufacture of cement, mixing, rheology and hydration, admixtures, characterization techniques and modeling, fiber-reinforced concrete, repair and retrofitting of concrete structures, novel testing techniques such as digital image correlation (DIC). Research on sustainable building materials like Geopolymer concrete and recycled aggregates are covered. In the area of earthquake engineering, papers related to the seismic response of load-bearing unreinforced masonry walls, reinforced concrete frame and buildings with dampers are covered. Additionally, there are chapters on structures subjected to vehicular impact and fire. The contents of this book will be useful for graduate students, researchers and practitioners working in the areas of concrete, earthquake and structural engineering.

Concrete Durability and Service Life Planning-Konstantin Kovler 2020-04-28 This volume gathers the proceedings of the 3rd International RILEM Workshop on Concrete Durability and Service Life Planning (ConcreteLife’20), held in Haifa, Israel in January 2020. The papers cover a range of topics in concrete curing, cracking in concrete structures, corrosion of steel in concrete, thermal and hygral effects, concrete in cold climates and under high temperatures, recycling, alkali-silica reactions, chloride and sulfate attacks, marine structures, transport phenomena, durability design, microstructure of concrete and volume changes, and life cycle assessment. The book also explores future trends in research, development, and practical engineering applications related to durable concrete construction, and focuses on the design and construction of concrete structures exposed to various environmental conditions and mechanical loading. Given its scope, it offers a valuable asset for all researchers and graduate students in the areas of cement chemistry, cement production, and concrete design.

Advanced Intelligent Systems for Sustainable Development (AI2SD’2019)-Mostafa Ezzjiyani 2020-03-03 This book gathers papers from the International Conference on Advanced Intelligent Systems for Sustainable Development (AI2SD-2019), held on July 08–11, 2019 in Marrakech, Morocco, which address the environment, industry and economy, and the role of advanced intelligent systems and computing in connection with these three fields. The book includes a host of interesting studies and successful applications regarding the economy and industry, e.g. in Manufacturing, Digital Factories, Smart Supply Chain Management in Industry, Project Management in Industry, Digital Economy, Digital Business, M-commerce, Blockchain and Digital Currencies. In addition, the book highlights work that addresses the environmental aspect, covering topics such as Big Data Analysis & the Internet of Things for Environmental Management, Sensor Networks for Environmental Services, Network Interoperability in Environmental Ecosystems, Wireless Sensors and Cognitive Radio Networks, Environmental Management Computing Systems, Sustainable Mobility Solutions, Remote Sensing Applications, Geo-information & Geophysics. Addressing social, legislative and environmental aspects, the book is intended for all stakeholders in the industrial world. It will be of interest e.g. to customers, helping them improve their profits and economic profitability, and to professionals and fishermen working to evolve and optimize their supply chains, and to improve productivity, in the fiercely competitive I4.0 world. The authors of each chapter report on the state of the art and present the outcomes of their own research, laboratory experiments, and successful applications. The purpose of the book is to combine the idea of advanced intelligent systems with appropriate tools and techniques for modeling, management, and decision support in the fields of the environment, industry and economy.

Advanced Building Materials-Guang Fan Li 2011-05-17 This collection of papers, which was subjected to strict peer-review by 2 to 4 expert referees, aims to collect together the latest advances in, and applications of, traditional constructional materials, advanced constructional materials and green building materials. It cannot fail to suggest new ideas and strategies to be tried in this field.

Recent Advances in Porous Ceramics-Uday M. Basheer Al-Naib 2018-09-19 Porous ceramics have recently gained growing importance in industry because of their many applications like filters, absorbers, dust collectors, thermal insulation, hot gas collectors, dielectric resonators, bioreactors, bone replacement and automobile engine components. Generally, porous ceramics have good properties such as mechanical strength, abrasion resistance, and chemical and thermal stability. These porous network ceramic structures also have relatively low density, low mass and low thermal conductivity. Furthermore, permeability is one of the most important properties of porous ceramics for different applications such as membranes because this property directly relates to the pressure drop during filtration. Pore size control is one key factor in fabrication of porous ceramics. The size of particles and their distribution of the raw materials, manufacturing techniques, types of binder used, distribution of binder, and sintering affect the final porosity and pore connectivity, are important things that must be considered during the manufacturing of a porous ceramic body. Therefore, the development of porous ceramic research requires sufficient mechanical and chemical stability as well as permeability. This book covers a wide range of topics such as porous ceramic structure and properties, preparation, simulation and fabrication, sintering, applications for bioceramics, sensors, magnetics and energy saving.

UNEP Year Book 2009-United Nations 2009-02 UNEP Year Book 2009: New Science and Developments in our Changing Environment presents work in progress on scientific understanding of global environmental change, as well as foresight about possible issues on the horizon. The aim is to raise awareness of the interlinkages among environmental issues that can accelerate the rates of change and threaten human wellbeing. The chapters of the Year Book track the same trajectory as our awareness of environmental change. Transformations are inherent to this trajectory and are taking place on many fronts: from industrial agriculture to eco-agriculture; from a wasteful society towards a resource efficient one; and from a triad of competing interests among civil society, the private sector, and governments to a more cooperative model based on mutual benefits.

Developments in Strategic Ceramic Materials II-Waltraud M. Kriven 2017-01-04 This issue contains 27 papers from The American Ceramic Society’s 40th International Conference on Advanced Ceramics and Composites, held in Daytona Beach, Florida, January 24-29, 2016. This issue includes papers presented in the following Symposia and Focused Sessions: Symposium 2 – Advanced Ceramic Coatings for Structural, Environmental, and Functional Applications; Symposium 10 – Virtual Materials (Computational) Design and Ceramic Genome; Symposium 11 – Advanced Materials and Innovative Processing Ideas for the Industrial Root Technology; Symposium 12 – Materials for Extreme Environments: Ultrahigh Temperature Ceramics; and Emerging Technologies Symposium–Carbon Nanostructures; and Focused Session 1 - Geopolymers and Chemically Bonded Ceramics.

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