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Introduction. This completely updated and expanded second edition stands as a comprehensive knowledgebase on both the fundamentals and applications of this important materials processing method. The diverse, international team of contributing authors of this reference clarify in extensive detail properties and applications of sol-gel science and technology as it pertains to the production of substances, active and non-active, including optical, electronic, chemical, sensor, bio- and ...

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Essential to a wide range of manufacturing industries, the compilation divides into the three complementary sections: Sol-Gel Processing, devoted to general aspects of processing and recently developed materials such as organic-inorganic hybrids, photonic crystals, ferroelectric coatings, and photocatalysts; Characterization of Sol-Gel Materials and Products, presenting contributions that highlight the notion that useful materials are only produced when characterization is tied to processing ...

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This comprehensive three-volume handbook brings together a review of the current state together with the latest developments in sol-gel technology to put forward new ideas. The first volume, dedicated to synthesis and shaping, gives an in-depth overview of the wet-chemical processes that constitute the core of the sol-gel method and presents the various pathways for the successful synthesis of inorganic and hybrid organic-inorganic

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3 Reviews. Since Dr. Dislich of Germany prepared a glass lens by the sol-gel method around 1970, sol-gel science and technology has continued to develop. Since then this field has seen remarkable...

~~Handbook of sol-gel science and technology. 1. Sol-gel ...~~

Sol-Gel Science: The Physics and Chemistry of Sol-Gel Processing presents the physical and chemical principles of the sol-gel process. The book emphasizes the science behind sol-gel processing with a chapter devoted to applications.

~~Sol-Gel Science | ScienceDirect~~

A decade after, Professor Klein, Doctor Aparicio, and Professor Jitianu started to work on the second edition having Professor Sakka as one of the main advisors. The second edition has been significantly updated and enriched and offers a comprehensive view of sol-gel processing, new characterization techniques, and novel applications. The comprehensive scope and integrated address of topics make this reference volume ideal for scientists and engineers across a wide range of disciplines and ...

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~~Handbook of sol-gel science and technology (eBook, 2017 ...~~

Sol-gel technology is a contemporary advancement in science that requires taking a multidisciplinary approach with regard to its various applications. This book highlights some applications of the sol-gel technology, including protective coatings, catalysts, piezoelectric devices, wave guides, lenses, high-strength ceramics, superconductors ...

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~~Sol Gel Chemistry Applied To Materials Science ebook PDF ...~~

The Journal of Sol-Gel Science and Technology (JSST) provides an international forum for the dissemination of scientific, technological, and general knowledge about materials processed by chemical nanotechnologies known as the "sol-gel" process.

~~Journal of Sol Gel Science and Technology | Home~~

This review covers the basics of sol – gel technology and the chemistry of alkoxysilanes, which are the most valuable sol – gel precursors in preparation of sol – gel materials and coatings. Results from early and recent studies are presented showing that sol – gel coatings provide strong corrosion protection for metals.

~~Handbook of Waterborne Coatings | ScienceDirect~~

There is a growing need for a comprehensive reference that treats both the fundamentals and the applications, and this is the aim of "Handbook of Sol-Gel Science and Technology." The primary purpose of sol-gel science and technology is to produce materials, active and non-active including optical, electronic, chemical, sensor, bio- and structural materials.

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~~The Sol-Gel Handbook, 3 Volume Set: Synthesis ...~~

L.C. Klein, M. Aparicio, A. Jitianu " Handbook of Sol-Gel Science and Technology; Processing Characterization and Applications, Springer New York, Second edition – expected to be publish in 2017 M. Apparicio, A. Jitianu, L.C. Klein " Sol-Gel Processing for Conventional and Alternative Energy " Springer- New York, February, 2012

~~Department of Chemistry—Andrei Jitianu—Lehman College~~
Handbook of Sol-gel Science and Technology: Sol-gel Processing v. 1: Processing, Characterization and Applications: Amazon.es:
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~~Handbook of Sol-gel Science and Technology: Sol-gel ...~~

In materials science, the sol – gel process is a method for producing solid materials from small molecules. The method is used for the fabrication of metal oxides, especially the oxides of silicon (Si) and titanium (Ti).

~~Sol – gel process—Wikipedia~~

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Since Dr. Disiich of Germany prepared a glass lens by the sol-gel method around 1970, sol-gel science and technology has continued to develop. Since then this field has seen remarkable technical developments as well as a broadening of the applications of sol-gel science and technology. There is a growing need for a comprehensive reference that treats both the fundamentals and the applications, and this is the aim of "Handbook of Sol-Gel Science and Technology."The primary purpose of sol-gel science and

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technology is to produce materials, active and non-active including optical, electronic, chemical, sensor, bio- and structural materials. This means that sol-gel science and technology is related to all kinds of manufacturing industries. Thus Volume 1, "Sol-Gel Processing," is devoted to general aspects of processing. Newly developed materials such as organic-inorganic hybrids, photonic crystals, ferroelectric coatings, photocatalysts will be covered. Topics in this volume include: Volume 2, "Characterization of Sol-Gel Materials and Products," highlights the important fact that useful materials are only produced when characterization is tied to processing. Furthermore, characterization is essential to the understanding of nanostructured materials, and sol-gel technology is a most important technology in this new field. Since nanomaterials display their functional property based on their nano- and micro-structure, "characterization" is very important. Topics found in Volume 2 include: Sol-gel technology is a versatile technology, making it possible to produce a wide variety of materials and to provide existing substances with novel properties. This technology was applied to producing novel materials, for example organic-inorganic hybrids, which are quite difficult to make by other fabricating techniques, and it was also applied to producing materials based on high temperature superconducting oxides. "Applications of Sol-Gel Technology," (Volume 3), will cover applications such as:

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general aspects of processing and recently developed materials such as organic-inorganic hybrids, photonic crystals, ferroelectric coatings, and photocatalysts; Characterization of Sol-Gel Materials and Products, presenting contributions that highlight the notion that useful materials are only produced when characterization is tied to processing, such as determination of structure by NMR, in-situ characterization of the sol-gel reaction process, determination of microstructure of oxide gels, characterization of porous structure of gels by the surface measurements, and characterization of organic-inorganic hybrid; and Applications of Sol-Gel Technology, covering applications such as the sol-gel method used in processing of bulk silica glasses, bulk porous gels prepared by sol-gel method, application of sol-gel method to fabrication of glass and ceramic fibers, reflective and antireflective coating films, application of sol-gel method to formation of photocatalytic coating films, and application of sol-gel method to bioactive coating films. The comprehensive scope and integrated treatment of topics make this reference volume ideal for R&D scientists and engineers across a wide range of disciplines and professional interests.

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Application of sol-gel method to fabrication of glass and ceramic fibers, Reflective and antireflective coating films, Planar waveguides prepared by sol-gel method, Films with micropatterns and two-dimensional photonic crystals, Application of sol-gel method to formation of ferroelectric films, Application of sol-gel method to formation of photocatalytic coating films, Application of sol-gel method to bioactive coating films.

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Aerogels are the lightest solids known. Up to 1000 times lighter than glass and with a density as low as only four times that of air, they show very high thermal, electrical and acoustic insulation values and hold many entries in Guinness World Records. Originally based on silica, R&D efforts have extended this class of materials to non-silicate inorganic oxides, natural and synthetic organic polymers, carbon, metal and ceramic materials, etc. Composite systems involving polymer-crosslinked aerogels and interpenetrating hybrid networks have been developed and exhibit remarkable mechanical strength and flexibility. Even more exotic aerogels based on clays, chalcogenides, phosphides, quantum dots, and biopolymers such as chitosan are opening new applications for the construction, transportation, energy, defense and healthcare industries.

Applications in electronics, chemistry, mechanics, engineering, energy production and storage, sensors, medicine, nanotechnology, military and aerospace, oil and gas recovery, thermal insulation and household uses are being developed with an estimated annual market growth rate of around 70% until 2015. The Aerogels Handbook summarizes state-of-the-art developments and processing of inorganic, organic, and composite aerogels, including the most important methods of synthesis, characterization as well as their typical applications and their possible market impact. Readers will find an exhaustive overview of all aerogel materials known today, their fabrication, upscaling aspects, physical and chemical properties, and most recent advances towards applications and commercial products, some of which are commercially available

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today. Key Features:

- Edited and written by recognized worldwide leaders in the field
- Appeals to a broad audience of materials scientists, chemists, and engineers in academic research and industrial R&D
- Covers inorganic, organic, and composite aerogels
- Describes military, aerospace, building industry, household, environmental, energy, and biomedical applications among others

This comprehensive three-volume handbook brings together a review of the current state together with the latest developments in sol-gel technology to put forward new ideas. The first volume, dedicated to synthesis and shaping, gives an in-depth overview of the wet-chemical processes that constitute the core of the sol-gel method and presents the various pathways for the successful synthesis of inorganic and hybrid organic-inorganic materials, bio- and bio-inspired materials, powders, particles and fibers as well as sol-gel derived thin films, coatings and surfaces. The second volume deals with the mechanical, optical, electrical and magnetic properties of sol-gel derived materials and the methods for their characterization such as diffraction methods and nuclear magnetic resonance, infrared and Raman spectroscopies. The third volume concentrates on the various applications in the fields of membrane science, catalysis, energy research, biomaterials science, biomedicine, photonics and electronics.

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