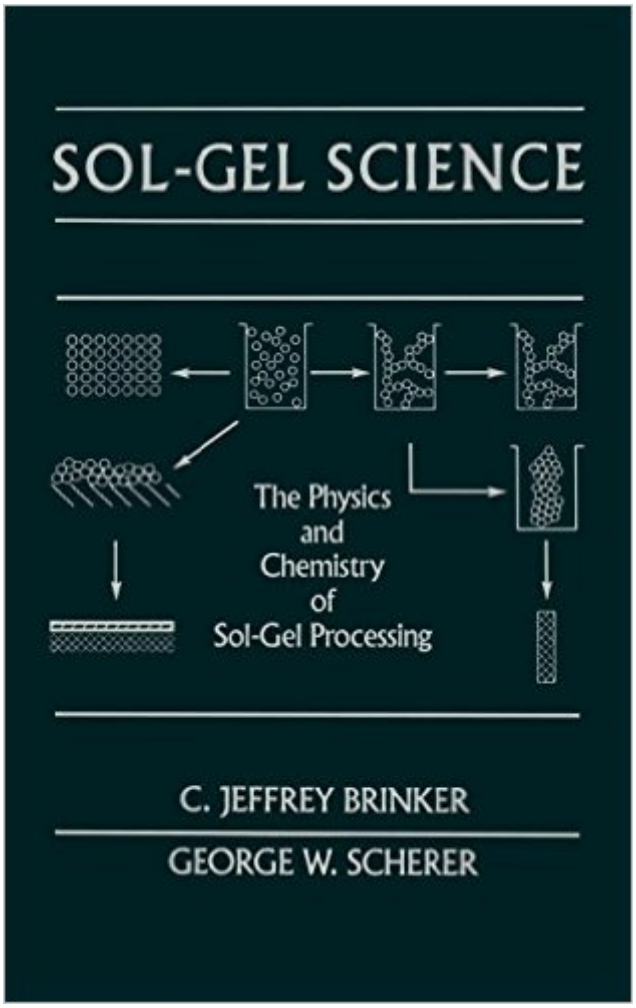
Sol-Gel Science: The Physics And Chemistry Of Sol-Gel Processing



Synopsis

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. The first chapter introduces basic terminology, provides a brief historical sketch, and identifies some excellent texts for background reading. Chapters 2 and 3 discuss the mechanisms of hydrolysis and condensation for nonsilicate and silicate systems. Chapter 4 deals with stabilization and gelation of sols. Chapter 5 reviews theories of gelation and examines the predicted and observed changes in the properties of a sol in the vicinity of the gel point. Chapter 6 describes the changes in structure and properties that occur during aging of a gel in its pore liquor (or some other liquid). The discussion of drying is divided into two parts, with the theory concentrated in Chapter 7 and the phenomenology in Chapter 8. The structure of dried gels is explored in Chapter 9. Chapter 10 shows the possibility of using the gel as a substrate for chemical reactions or of modifying the bulk composition of the resulting ceramic by performing a surface reaction (such as nitridation) on the gel. Chapter 11 reviews the theory and practice of sintering, describing the mechanisms that govern densification of amorphous and crystalline materials, and showing the advantages of avoiding crystallization before sintering is complete. The properties of gel-derived and conventional ceramics are discussed in Chapter 12. The preparation of films is such an important aspect of sol-gel technology that the fundamentals of film formation are treated at length in Chapter 13. Films and other applications are briefly reviewed in Chapter 14.Materials scientists and researchers in the field of sol-gel processing will find the book invaluable.

Book Information

Hardcover: 912 pages
Publisher: Academic Press; 1 edition (May 12, 1990)
Language: English
ISBN-10: 0121349705
ISBN-13: 978-0121349707
Product Dimensions: 6 x 1.9 x 9 inches
Shipping Weight: 3 pounds (View shipping rates and policies)
Average Customer Review: 4.3 out of 5 starsÂ Â See all reviewsÂ (3 customer reviews)
Best Sellers Rank: #1,154,609 in Books (See Top 100 in Books) #43 inÂ Books > Engineering & Transportation > Engineering > Chemical > Coatings, Ceramics & Glass #110 inÂ Books >

Engineering & Transportation > Engineering > Materials & Material Science > Extraction & Processing #215 inÂ Books > Science & Math > Chemistry > Inorganic

Customer Reviews

Perhaps it’s trite to say this, but Brinker and Scherer’s _Sol Gel Science_ is *the* indispensible desktop reference for the sol-gel chemist. Though now over a decade old, the topics covered (only a smattering of which are mentioned in the editorial review above) are so fundamental that it remains one of the most often cited sol-gel references, both in texts and refereed journal articles. The layout of the book takes the reader through the entire sol-gel formation process, from reaction to casting to drying, curing and other post-modificiations, with a chapter devoted to each step - permitting this book either to be read cover-to-cover (for the interested newcomer or as a text for a course in sol-gel science) or to be referenced as necessary by the more familiar reader.C. Jeffrey Brinker, now affiliated with Sandia National Laboratories as well as the University of New Mexico, remains the preeminent researcher and one of the most-often cited authors in his field, continuing research on self-assembled nanostructures, porosity-tailored materials, organic-inorganic hybrids, and related topics.George W. Scherer, professor in the Civil and Environmental Engineering Department of Princeton University, also maintains a professional involvement in sol-derived gels, glasses, and ceramics, among other areas of interest, and is the author of several patents, as well as innumerable scientific papers, in these fields.Though more-recent texts may be more up-to-date in terms of research cited, especially areas pertinent to nanotechnology, this book’s position as a compendium of knowledge in the field of sol-gel science has not diminished with age and is highly reccomended.

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great book.

Organic Chemistry I: The EASY Guide to Ace Organic Chemistry I: (Organic Chemistry Study Guide, Organic Chemistry Review, Concepts, Reaction Mechanisms and Summaries) Ace General Chemistry I: The EASY Guide to Ace General Chemistry I: (General Chemistry Study Guide, General Chemistry Review) Light Science: Physics and the Visual Arts (Undergraduate Texts in Contemporary Physics) Problems and Solutions in Quantum Chemistry and Physics (Dover Books on Chemistry) Bayesian Signal Processing: Classical, Modern and Particle Filtering Methods (Adaptive and Cognitive Dynamic Systems: Signal Processing, Learning, Communications and Control) Speech and Audio Signal Processing: Processing and Perception of Speech and Music Physics and Chemistry of Photochromic Glasses (Laser & Optical Science & Technology) The Meaning of Quantum Theory: A Guide for Students of Chemistry and Physics (Oxford Science Publications) Biosignal and Medical Image Processing (Signal Processing and Communications) Signal Processing Algorithms in Fortran and C (Prentice-Hall Signal Processing Series) Materials Processing: A Unified Approach to Processing of Metals, Ceramics and Polymers Extensible Processing for Archives and Special Collections: Reducing Processing Backlogs SBI: Advanced Word Processing Simulation (with CD-ROM) (Word Processing I) Multidimensional Digital Signal Processing (Prentice-Hall Signal Processing Series) Digital Signal Processing with Examples in MATLABÃ Â®, Second Edition (Electrical Engineering & Applied Signal Processing Series)