



# Handbook of Sol-Gel Science and Technology: Processing, Characterization and Applications, V. I - Sol-Gel Processing/Hiromitsu Kozuka, Editor, V. II - ... in Engineering & Computer Scienc) (v. 1)

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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 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: Synthesis and reaction of sol-gel precursors, Preparation of bulk glass and ceramics, Processing of porous materials based on self-organization, Synthesis of organic-inorganic hybrid materials, Coating of plastics, Special processes used in sol-gel formation of materials (1. Non-hydrolytic sol-gel process, 2. Sonogels, and 3. UV irradiation). **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: 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, Characterization of organic-inorganic hybrid, Measurements of rheological properties, Measurements of functional properties: fluorescence, laser, non-linear optical and other properties. 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.

**Volume 3, Applications of Sol-Gel Technology**, will cover applications such as: Application of sol-gel method to 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, 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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## Editorial Review

### Review

From the reviews:

"This three-volume handbook is a compilation of chapters on various topics concerning sol-gels. ... each chapter is self-contained and includes an extensive list of references. The chapters are consistent in style and format ... . This handbook contains a wealth of valuable information ... . Summing Up: Recommended. Graduate students through professionals." (R. Darby, CHOICE, Vol. 42 (10), 2005)

### From the Back Cover

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