

Book Reviews

Sol-Gel, Drug Release, Superconductors and Liquid Crystals

Sol-Gel Technology for Thin Films, Fibers, Preforms, Electronics and Specialty Shapes. Edited by *L. C. Klein*. Noyes Publications, New Jersey, USA 1988. xxi, 407 pp., bound, US\$ 72. — ISBN 0-8155-1154-X

Sol-gel technology has been a popular subject in materials science and engineering for some four decades. Its promise for the preparation of controlled and homogeneous compositions and for the fabrication of various forms such as powders, fibers, coatings and monoliths has made it the potential answer for many of the problems which have been identified by people working with the processing of ceramics and glass. The technology has proved difficult to apply to some of the more classical sectors of ceramics such as powder and monolith preparation but notable successes have been achieved particularly where precise performance is required in components of limited dimensions (films, coatings, fibers).

The present book performs the valuable function of summarizing the technical advances that have been made in the subject to the end of 1987. In 17 chapters contributed by 27 authors and co-authors drawn from the United States, from Europe and from Japan, sol-gel technology is reviewed with emphasis on examples where progress in applications has been achieved. The editor has been successful in building the book around a logical arrangement which allows the different sectors of the technology to be systematically treated; there is throughout an emphasis on processing methods and on applications and this together with the concentration on topics where commercial success has been reached or can be foreseen, makes the book a valuable and instructive guide for those wishing to find their way in what has become a complex subject.

The opening section of the book contains three introductory chapters which review the preparation of glass using sol-gel methods, the contribution which has been made by molecular dynamics theory to the understanding of the sol-gel process and the subject of phase transformations in gels; in the latter, emphasis is given to the differences that can be identified between the behavior of gel derived and conventional glasses.

The second part of the book relates to the preparation of coatings and thin films by the sol-gel process. As pointed out in the opening chapter on film preparation, such coatings directly exploit the advantages of the sol-gel process; they have reached commercial application in large quantities and they in fact predate much of the fashionable interest of recent years. Specialized treatments of anti-reflective films and of oxynitride films are given in separate chapters. The third part of the book describes the use of sol-gel methods for the

preparation of fibers by drawing, blowing or by unidirectional freezing. Following a review of such developments, more detailed treatments are given of the aluminoborosilicate system and of the preparation of continuous fibers.

The fourth section of the book describes the use of sol-gel procedures for monolith formation. The treatment is in terms of glass products and this indeed reflects a general tendency in the book; where appropriate, discussions are included of the polycrystalline products which can stem from sol-gel methods but the major attention is given to glasses and amorphous systems. This section also includes descriptions of thermal insulation, of the manufacture of ultrapure glass and of particulate gels and glasses. The book concludes with a section devoted to specific applications of the technology. Following a short chapter on the fabrication of electronic ceramics, there are treatments of superionic conducting systems (both glass and crystalline, with emphasis on sodium and lithium conductors) of the fabrication of hollow glass microspheres and of filters and membranes.

The editor is to be congratulated on having assembled a timely and authoritative text around a subject which has caused a certain degree of confusion. The emphasis on practical aspects and on applications will be of particular value for those who are trying to clarify the precise contribution to be expected from this much debated technology.

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Controlled Release of Drugs: Polymers and Aggregate Systems. Edited by *M. Rosoff*, VCH Verlagsgesellschaft, Weinheim, 1989, xi, 315 pp., bound, DM 132. — ISBN 3-527-26797-2

This book is the first in a designated series intended to provide topical reviews in various areas of controlled release technology as well as from other pertinent disciplines where advances may contribute to the field of controlled release. The series itself is designed to consolidate, across a wide breadth of topics, a rapidly expanding primary literature database; each volume within the series supposedly allowing substantial review of specific current areas while emphasizing the more subjective exploration of ideas and speculation for future directions from the authors of each chapter. The overall goal of such a strategy is to provide a relevant overview of controlled release issues, problems and progress aiming at broad readership, practical utility and volume longevity. To achieve this the editors of each volume have collected an impressive set of advisory editors to assure and