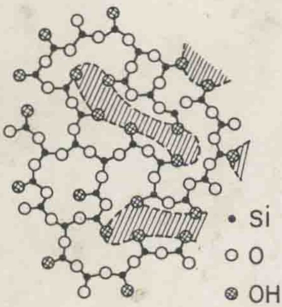
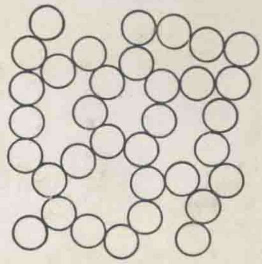
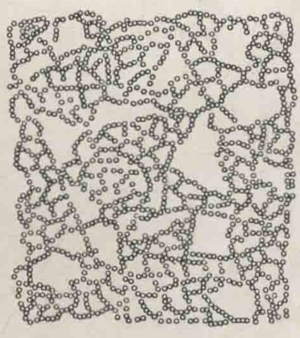
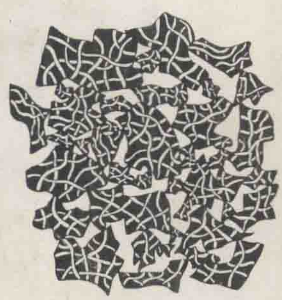
SOL-GEL TECHNOLOGY FOR THIN FILMS, FIBERS, PREFORMS, ELECTRONICS AND SPECIALTY SHAPES









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SOL-GEL TECHNOLOGY
FOR THIN FILMS, FIBERS, PREFORMS, ELECTRONICS, AND SPECIALTY SHAPES

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To my daughter, Martha Ann Kinsella, who was born while the book was in progress.

and

To Dennis Ravaine, my scientific collaborator and friend, who passed away suddenly in 1986.

Preface

This book covers the principles, developments, techniques, and applications of sol-gel processing. The sol-gel process is not new, however, a few commercial successes in the recent past have revived interest. The commercial successes are largely in the area of thin films. These films have been developed for optical, mechanical and electrical applications. About one-third of this book covers thin films.

The second area where there has been commercial success is fibers. These fibers whether spun or drawn may be continuous or woven. The applications realized and projected are refractories, composite reinforcement and thermal insulation. About one-third of this book covers fibers.

The third area encompasses the special applications such as preforms, microballoons and electronics. Discussion of the chemistry, polymerization, drying and characterization are all necessary parts of a treatment of sol-gel processing.

The anticipated product of this effort is a book that covers the background and fundamentals. Also, it evaluates the present technology and projects new directions short range and long range.

The graduate students at Rutgers University, P. Anderson, H. deLambilly, T. Gallo, T. Lombardi and J. Ryan, are thanked for their editorial assistance. Visiting scientists Jean-Yves Chane-Ching and Henry Wautier served as reviewers.

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December 1987

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