

# The Complete Book on Glass Technology



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**Format:** Paperback

**ISBN:** 8178330172

**Code:** NI205

**Pages:** 584

**Price:** Rs. 1,625.00 **US\$** 150.00

**Publisher:** Asia Pacific Business Press Inc.

Usually ships within **5** days

Glass is an amorphous solid usually formed by the solidification of a melt without crystallisation. It is an inorganic product of melting, which has been cooled to rigid state without crystallization. Melting is in fact the sole large scale industrial method of glass making. Glass is being used worldwide and has various applications. They are typically brittle and optically transparent. It is widely used in buildings and having industrial applications. The presence of glasses in our everyday environment is so common that we rarely notice their existence. Glass, as a substance, plays an essential role in science and industry. There are various methods of glass making other than melting for example condensation of vapours, conversion of crystals to an amorphous form using mechanical means or irradiation with fast neutrons, dehydration and sintering of gels, etc. Silica (the chemical compound  $\text{SiO}_2$ ) is a common fundamental constituent of glass. The properties of glass can be varied and regulated over an extensive range by modifying the composition, production techniques, or both. In any glass, the mechanical, chemical, optical, and thermal properties cannot occur separately. Instead, any glass represents a combination of properties, and in selecting an individual glass for a product, it is this combination that is important. As an architectural element, glass has become the quite essential product for your home or building. The applications of glass are limited only by your imagination; glass has many applications both internal and external that play a vital role in the function and design of your project. Industrially produced glasses can be divided into groups according to various criteria: composition, appearance, properties, application, method of forming etc. According to their chemical composition glasses are classified as silica glass (quartz glass), water (soluble) glass or sodium silicate glass, crystal glass, heat resistant glass, low alkali glass etc. Glass is finding ever wider applications in modern technology; sealing glasses which have been in use for many years, serve in vacuum tight joining of glass to metal, especially in vacuum electronics, in nuclear technology (protection from radiation, immobilization of radioactive waste by fusion into a chemically, resistant glass, etc.), in agriculture (as carrier of fertilizers with long term effects) and a number of possible application in electronics and many more. Some of the fundamentals of the book are structure of glass, structure of special melts and glasses, composition of glass, glass formation, crystallization and liquid, optical properties, theoretical strength of glasses, practical strengths of glasses, flaw sources and removal, viscosity of glass forming melts, theoretical principles of glass melting, chemical reactions occurring in glass melting, dissolution of solids in the melt, flow of glass in melting furnaces, physical chemical factors in sol gel processing, deposition of transparent non crystalline, metal oxide coatings by the sol gel process etc.

The present book covers different important parameters of glass technology. The book is comprehensive guide for researchers, technologists, new entrepreneurs and professionals.

## Contents

### 1. GLASS

Definition and Historical Summary  
Structure of Glass  
Structure of Special Melts and Glasses  
Composition of Glass  
Glass Formation, Crystallization and Liquid Immiscibility  
Chemical, Mechanical and Physical Properties of Industrially Important Melts and Glasses  
Rheological Properties of Glass Melts  
Surface Tension  
Density  
Thermal Expansion  
Elastic Properties  
Mechanical Strength  
Hardness  
Thermal Properties  
Electrical Properties  
Gas Permeability  
Chemical Stability and Surface Properties  
Optical Properties  
Color of Glasses  
Production of Glass  
Raw Materials  
Melting Units  
Melting, Fining and Homogenization  
Glass Cooling  
Heating and Regulating Glass Melts  
Refractory Lining of Melting Units  
Vapor-Deposited Glasses  
Occupational Health  
Forming  
Hand Forming  
Annealing  
Secondary of Finishing Operations  
Uses  
Silica and Silica-like Glass  
Flat Glass  
Laboratory Glassware  
Light-Sensitive Glass  
Display Devices  
Glass Fibers  
Molded Optics  
Glasses for Nonlinear Optical Devices  
Economic Aspects

### 2. OPTICAL PROPERTIES

Introduction  
Bulk Optical Properties  
Refractive Index  
Molar and Ionic Refractivities  
Dispersion  
Ultraviolet Absorption  
Visible Absorption  
Ligand Field Coloration of Glasses  
Amber Glass  
Colloidal Metal Colors  
Colloidal Semiconductor Colors  
Radiation-induced Colors  
Solarization  
Infrared Absorption  
Infrared Absorption by Bound Hydrogen Species  
Infrared Absorption by Dissolved Gases  
Infrared Cutoffs or the Multiphonon Edge  
Other Optical Properties of Glasses  
Photosensitive and Photochromic Glasses  
Opal Glasses  
Faraday Rotation

### 3. MECHANICAL PROPERTIES

Introduction  
Elastic Modulus  
Hardness  
Fracture Strength  
Theoretical Strength of Glasses  
Practical Strengths of Glasses  
Flaw Sources and Removal  
Strengthening of Glass  
Statistical Nature of Fracture of Glass  
Fatigue of Glasses  
Thermal Shock  
Annealing of Thermal Stresses

### 4. VISCOSITY OF GLASSFORMING MELTS

Introduction  
Viscosity Definitions and Terminology  
Viscoelasticity  
Viscosity Measurement Techniques  
Rotation Viscometers  
Falling Sphere Viscometers  
Fiber Elongation Viscometers  
Beam-bending Viscometers  
Other Viscometers  
Temperature Dependence of Viscosity  
Fragility of Melts  
Free Volume Model for Viscous Flow  
Entropy Model for Viscous Flow  
Compositional Dependence of Viscosity  
Silicate Melts  
Borate Melts  
Germanate Melts  
Halide Melts

Chalcogenide Melts

Effect of Hydroxyl on Melt Viscosities

Effect of Thermal History on Viscosity

Effect of Phase Separation on Viscosity

Effect of Crystallization on Viscosity

## 5. STRUCTURE OF GLASSES

Glass Formation

Models of Glass Structure

The Structure of Oxide Glasses

Submicrostructural Features of Glasses

Miscibility Gaps in Oxide Systems

General Discussion

## 6. GLASS TECHNOLOGY

The Characteristics of Glass

Properties of Molten Glasses

Viscosity

Crystallization

Surface Tension

Density

Specific Heat

Thermal Conductivity

Electrical Conductivity

Theoretical Principles of Glass Melting

Chemical Reactions Occurring in Glass Melting

Dissolution of Solids in the Melt

Flow of Glass in Melting Furnaces

Homogenization

Volatilization

Refining and Solubility of Gases

Flat Glass and Tube-forming Processes

The Forming of Glass Fibres

Properties of Glass

Mechanical Properties

Thermal Properties

Optical Properties

Electrical Properties

Chemical Durability

Principle Types of Industrial Glasses

Silica Glass (quartz glass)

Sodium-Silicate Glass (water glass)

Sheet and Container Glass; the System  $\text{Na}_2\text{O}-\text{CaO}-\text{SiO}_2$

Crystal Glass; the System  $\text{K}_2\text{O}-\text{CaO}-\text{SiO}_2$  and  $\text{K}_2\text{O}-\text{PbO}-\text{SiO}_2$

Heat-Resistant Glasses of the System  $\text{Na}_2\text{O}-\text{B}_2\text{O}_3-\text{SiO}_2$

Coloured Glasses

Opal Glasses

Optical Glasses

Glass Fibres

Other Types of Oxide Glasses and Products

Chalcogenide Glasses

## 7. NITRIDATION OF SILICA SOL-GEL THIN FILMS

Introduction

Experimental Methods

Results and Discussion

Film Shrinkage  
Refractive Index  
SIMS Depth Profiles  
Auger Analyses  
Enhancing the Nitridation Reaction with a Chlorine  
Pretreatment

## 8. MODIFICATION OF OXIDES BY POLYMERIZATION PROCESS

Introduction  
Introduction of Chemical-Structural Variations in  
Inorganic Polymers  
Theoretical Bases  
Experimental  
Effect on Properties  
Effect on Densification and Viscosity  
Effect on Crystallization and Crystalline Transformations

## 9. DRYING AND FIRING MONOLITHIC SILICA SHAPES FROM SOL-GELS

Introduction  
Experimental Technique  
Results and Discussion

## 10. SOL-GEL-DERIVED INDIUM-TIN-OXIDE COATINGS

Introduction  
Properties of Sol-Gel Derived ITO Coatings  
Characteristic Properties of ITO-Coatings for Window-  
Systems Derived from Dip Coating  
Optical Properties  
Architectural Properties  
Mechanical Properties  
Chemical Properties  
Long-Term Stability, Weatherability, Outdoor Tests  
Properties of an Insulating Glass Unit (One Pane ITO-  
Coated)

## 11. RELATIONSHIPS BETWEEN THE SOL-TO-GEL AND GEL-TO-GLASS CONVERSIONS

Introduction  
Gelation  
Gel-to-Glass Conversion  
Experimental  
Results & Discussion  
Physical Properties  
Shrinkage and Densification  
Isothermal Shrinkage Experiments

## 12. MONOLITHIC XERO-AND AEROGELS FOR GEL-GLASS PROCESSES

Introduction  
Main Steps in Gel Processing  
Cracking During the Drying Process  
Analysis of Causes of Cracking  
Effect of Capillary Forces  
Concept of Moisture Stress  
Mechanical Resistance of the Gel  
Ways of Avoiding Cracking During Drying

Monolithic Aerogels

Conclusion

### 13. BEHAVIOR OF MONOLITHIC SILICA AEROGELS

AT TEMPERATURES ABOVE 1000°C

Introduction

Densification of the Gel

Experimental Procedure

Results and Discussion

Conclusion

### 14. TiO<sub>2</sub> COATED GLASS BEADS

Introduction

Experimental

Materials

Instrumentation

Preparation of Catalysts

Hydrogenation Experiments

Results and Discussion

Features of Glass Beads Coated with TiO<sub>2</sub>

Catalytic Activity of Pd Dispersions on TiO<sub>2</sub> Coated

Glass Supports

### 15. DEPOSITION OF TRANSPARENT NON-CRYSTALLINE

METAL OXIDE COATINGS BY THE SOL-GEL PROCESS

Introduction

Dip-Coating Technique

Single-Layer Coatings with Refractive Index Gradient

Experimental Work

Results and Discussion

SiO<sub>2</sub>-B<sub>2</sub>O<sub>3</sub>-Na<sub>2</sub>O System

SiO<sub>2</sub>-BaO System

### 16. PHYSICAL CHEMICAL FACTORS IN SOL-GEL

PROCESSING

Introduction

Gel Synthesis

Principles of Gelation

Silica Gel

TiO<sub>2</sub> Gels

SiO<sub>2</sub>-B<sub>2</sub>O<sub>3</sub> Gels

SiO<sub>2</sub>-TiO<sub>2</sub> Gels

Na<sub>2</sub>O-SiO<sub>2</sub> Gels

Drying

The Gel-Glass Conversion

Conclusions

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Sat, 24 Jul 2021 00:10:20 +0530