

The Complete Book on Glass Technology

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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 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 1000Å°C
Introduction
Densification of the Gel
Experimental Procedure
Results and Discussion

Conclusion

14. TiO₂ COATED GLASS BEADS

Introduction

Experimental

Materials

Instrumentation

Preparation of Catalysts

Hydrogenation Experiments

Results and Discussion

Features of Glass Beads Coated with TiO₂

Catalytic Activity of Pd Dispersions on TiO₂ 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

SiO₂-B₂O₃-Na₂O System

SiO₂-BaO System

16. PHYSICAL CHEMICAL FACTORS IN SOL-GEL PROCESSING

Introduction

Gel Synthesis

Principles of Gelation

Silica Gel

TiO₂ Gels

SiO₂-B₂O₃ Gels

SiO₂-TiO₂ Gels

Na₂O-SiO₂ Gels

Drying

The Gel-Glass Conversion

Conclusions

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