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Autore	Schmelzer Jurn W. P
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Altri autori (Persone)	GutzowIvan S MazurinOleg V
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Nota di contenuto	Glasses and the Glass Transition; Foreword; Contents; Preface; Contributors; 1 Introduction; 2 Basic Properties and the Nature of Glasses: an Overview; 2.1 Glasses: First Attempts at a Classification; 2.2 Basic Thermodynamics; 2.2.1 The Fundamental Laws of Classical Thermodynamics and Consequences; 2.2.2 Thermodynamic Evolution Criteria, Stability Conditionsand the Thermodynamic Description of Nonequilibrium States; 2.2.3 Phases and Phase Transitions:Gibbs's Phase Rule, Ehrenfest's Classification, and the Landau Theory 2.3 Crystallization, Glass Transition and Devitrification of Glass-Forming Melts: an Overview of Experimental Results2.4 The Viscosity of Glass-Forming Melts; 2.4.1 Temperature Dependence of the Viscosity; 2.4.2 Significance of Viscosity in the Glass Transition; 2.4.3 Molecular Properties Connected with the Viscosity; 2.5 Thermodynamic Properties of Glass-Forming Melts and Glasses: Overview on Experimental Results; 2.5.1 Heat Capacity; 2.5.2 Temperature Dependence of the

Thermodynamic Functions: Simon's Approximation

2.5.3 Further Methods of Determination of Caloric Properties of Glass-Forming Melts and Glasses
2.5.4 Change of Mechanical, Optical and Electrical Properties in the Glass Transition Range; 2.6 Thermodynamic Nature of the Glassy State; 2.7 Concluding Remarks; 3 Generic Theory of Vitrification of Glass-Forming Melts; 3.1 Introduction; 3.2 Basic Ideas and Equations of the Thermodynamics of Irreversible Processes and Application to Vitrification and Devitrification Processes; 3.2.1 Basic Assumptions; 3.2.2 General Thermodynamic Dependencies
3.2.3 Application to Vitrification and Devitrification Processes
3.3 Properties of Glass-Forming Melts: Basic Model Assumptions; 3.3.1 Kinetics of Relaxation; 3.3.2 Thermodynamic Properties: Generalized Equation of State; 3.4 Kinetics of Nonisothermal Relaxation as a Model of the Glass Transition: Change of the Thermodynamic Functions in Cyclic Cooling-Heating Processes; 3.4.1 Description of the Cyclic Processes under Consideration; 3.4.2 Temperature Dependence of the Structural Order Parameter in Cyclic Cooling and Heating Processes
3.4.3 Definition of the Glass Transition Temperature via the Structural Order Parameter: the Bartenev--Ritland Equation
3.4.4 Structural Order Parameter and Entropy Production; 3.4.5 Temperature Dependence of Thermodynamic Potentials at Vitrification; 3.4.6 Cyclic Heating-Cooling Processes: General Results; 3.5 The Prigogine-Defay Ratio; 3.5.1 Introduction; 3.5.2 Derivation; 3.5.3 Comparison with Experimental Data; 3.5.4 Discussion; 3.6 Fictive (Internal) Pressure and Fictive Temperature as Structural Order Parameters; 3.6.1 Brief Overview
3.6.2 Model-Independent Definition of Fictive (Internal) Pressure and Fictive Temperature

Sommario/riassunto

Written by renowned researchers in this field, this up-to date advanced treatise fills a gap in the literature on glasses. It gives an overview of basic experimental data, of its collection, prediction and theoretical interpretation, thereby paving the way to a deeper understanding of these topics. The present monograph covers the whole spectrum of problems involved in the interpretation of glasses and their properties such as glass transition, relaxation, viscosity, existing and possible unexpected future applications of glasses. The book is recommended for students, to both n
