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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Frontmatter -- Contents -- Preface -- Foreword -- Introduction -- Contributors -- Main symbols and physical constants -- Abbreviations -- Main crystalline phases considered in this book -- Chapter 1: The classical nucleation theory -- Chapter 2: Beyond the classical nucleation theory -- Chapter 3: Thermodynamics of the glassy and the crystalline states – General kinetics of return to equilibrium -- Chapter 4: Phase separation processes in glass -- Chapter 5: Solid-state chemistry approach of the main crystalline phases in glass-ceramics -- Chapter 6: Elaboration and control of glass-ceramic microstructures -- Chapter 7: X-ray diffraction and glass-ceramic materials -- Chapter 8: Glass and crystallisation: mechanical properties -- Chapter 9: Electron microscopy applied to the study of nucleation and crystallisation in glasses -- Chapter 10: X-ray and neutron small-angle scattering -- Chapter 11: Nuclear Magnetic Resonance: deciphering disorder and crystallisation phenomena in glassy materials -- Chapter 12: Raman spectroscopy: a valuable tool to improve our understanding of nucleation and growth mechanism -- Chapter 13: In situ crystallisation investigations using large scale facilities -- Chapter 14: Commercial applications of glass-ceramics -- Glass and glass-ceramic biomaterials -- Chapter 16: Colouring by metallic nanoparticles -- Chapter 17. Transparent glass-ceramics -- Chapter 18: Luminescence properties of rare earth ions doped in insulating nanoparticles embedded in glassy

hosts -- Chapter 19: Glass-ceramics for engineering optical properties and nonlinear optics for engineering glass ceramics -- Chapter 20: Oxyfluoride glass-ceramics -- Chapter 21: Nucleation, crystallisation and phase separation in chalcogenide glasses -- Chapter 22: Glass-ceramics for waste immobilization -- Chapter 23: Crystalline glazes -- References -- Index -- Figures Rights & Permissions

Sommario/riassunto

Glass-ceramics are now commonplace in our daily lives, despite having only been discovered for less than a century. Much still remains to be investigated and understood about these materials, both in their applications as well as in the underlying scientific concepts. This book aims to contribute to this objective, providing a complete overview on these materials. It presents an update on the recent developments concerning the mechanisms of nucleation, crystal growth and phase separation, bringing together theoretical aspects and characterization methods. It also covers current and future applications of a large variety of glass-ceramics. The book comprises three main parts. The first proposes an assessment of the various theories on nucleation, growth and phase separation in glassy systems. The second describes microscopic and spectroscopic analytical tools and focuses on recent advances applied to the characterization of glass-ceramics. The last part presents different families of glass-ceramics (oxides, oxyfluorides, chalcogenides) and their applications in many areas (optics, biomedical, domestic, artistic, storage of hazardous wastes.). This reference book is destined to students (Master, PhD levels...), lecturers, researchers, engineers, at university or in industry, or just those of us who are curious and keen to discover the exciting world of transformation of glass into these "hybrid" glass-ceramic materials, arising through this apparently simple glass to crystal transformation.