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Sommario/riassunto

This book deepens the current understanding of the thermodynamics and kinetics of metallic glass-forming liquids, and their connection with the glass-formation process in terms of fundamental physical metallurgy concepts. It surveys and reports on the progress made in the last few decades to access the ultra-viscous liquid state of thermally stable bulk metallic glass (BMG) forming alloys and study the changes in atomic structure, viscosity, and enthalpy during the vitrification including physical aging. Featuring a comprehensive look at the physical properties of the undercooled liquid in the ultra-viscous state at temperatures near the glass transition, the book reports on detailed investigations of the thermodynamic functions, viscosity, volume, relaxation time, and structural ordering in the undercooled liquid. Additionally, it introduces state-of-the-art in-situ characterization tools such as chip-calorimetry, synchrotron x-ray diffraction, and x-ray photon correlation spectroscopy as applied to novel studies of liquid–liquid transitions in the supercooled liquid and in the vicinity of the glass transition, and establishes these common, if not universal, phenomena in BMG-forming alloys. This book is intended for researchers, graduate students, and professionals in the fields of materials science, physical metallurgy, and condensed matter physics, who are interested in the thermodynamics and kinetics of metallic glass-forming liquids and their connection with the glass

formation process.