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Nota di contenuto	PART I: Classical Theories of Phase Equilibria and Transformations -- Chapter 1: Stability of Systems and States -- Chapter 2: Thermodynamic Equilibrium of Phases -- Chapter 3: Examples of Phase Transitions -- Chapter 4: Isothermal Kinetics of Phase Transformations -- Chapter 5: Coarsening of Second Phase Precipitates -- Chapter 6: Spinodal Decomposition in Binary Systems -- Chapter 7: Thermal Effects in Kinetics of Phase Transformations -- PART II: The Method -- Chapter 8: Landau Theory of Phase Transitions -- Chapter 9: Heterogeneous Equilibrium Systems -- Chapter 10: Dynamics of Homogeneous Systems -- Chapter 11: Evolution of Heterogeneous Systems -- Chapter 12: Thermodynamic Fluctuations -- Chapter 13: Multi-Physics Coupling: Thermal Effects of Phase Transformations --

Chapter 14: Validation of the Method -- PART III: Applications -- Chapter 15: Conservative Order Parameter: Theory of Spinodal Decomposition in Binary Systems -- Chapter 16: Complex Order Parameter: Ginzburg-Landau's Theory of Superconductivity -- Chapter 17: Multicomponent Order Parameter: Crystallographic Phase Transitions -- Chapter 18: "Mechanical" Order Parameter -- Chapter 19: Continuum Models of Grain Growth.

Sommario/riassunto

This book describes a novel and popular method for the theoretical and computational study of phase transformations and materials processing in condensed and soft matter. The field theoretic method for the study of phase transformations in material systems, also known as the phase-field method, allows one to analyze different stages of transformations within a unified framework. It has received significant attention in the materials science community due to many recent successes in solving or illuminating important problems. In a single volume, this book addresses the fundamentals of the method starting from the basics of the field theoretic method along with its most important theoretical and computational results and some of the most advanced recent results and applications. Now in a revised and expanded second edition, the text is updated throughout and includes material on the classical theory of phase transformations. This book serves as both a primer in the area of phase transformations for those new to the field and as a guide for the more seasoned researcher. It is also of interest to historians of physics.