

1. Record Nr.	UNINA9910823730503321
Autore	Kang S.-J. L (Suk-Joong L.)
Titolo	Sintering : densification, grain growth, and microstructure // Suk-Joong L. Kang
Pubbl/distr/stampa	Amsterdam ; ; Boston ; ; London, : Elsevier Butterworth-Heinemann, 2005
ISBN	1-281-00635-1 9786611006358 0-08-049307-6
Edizione	[1st ed.]
Descrizione fisica	1 online resource (279 p.)
Disciplina	671.373
Soggetti	Sintering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Front matter; Half Title Page; Title Page; Copyright; CONTENTS; PREFACE; PART I: BASIS OF SINTERING SCIENCE; 1. SINTERING PROCESSES; 1.1 WHAT IS SINTERING?; 1.2 CATEGORIES OF SINTERING; 1.3 DRIVING FORCE AND BASIC PHENOMENA; 1.4 SINTERING VARIABLES; 2. THERMODYNAMICS OF THE INTERFACE; 2.1 SURFACE ENERGY AND ADSORPTION; 2.2 SURFACE TENSION AND SURFACE ENERGY; 2.3 THERMODYNAMICS OF CURVED INTERFACES; 3. POLYCRYSTALLINE MICROSTRUCTURES; 3.1 INTERFACIAL TENSION AND MICROSTRUCTURE; 3.2 SINGLE-PHASE MICROSTRUCTURES; 3.3 MULTIPHASE MICROSTRUCTURES; PROBLEMS GENERAL REFERENCES FOR SINTERING SCIENCE REFERENCES; PART II: SOLID STATE SINTERING MODELS AND DENSIFICATION; 4. INITIAL STAGE SINTERING; 4.1 TWO-PARTICLE MODEL; 4.2 SINTERING KINETICS; 4.3 SINTERING DIAGRAMS; 4.4 EFFECT OF SINTERING VARIABLES ON SINTERING KINETICS; 4.5 USEFULNESS AND LIMITATIONS OF THE INITIAL STAGE SINTERING THEORY; 5. INTERMEDIATE AND FINAL STAGE SINTERING; 5.1 INTERMEDIATE STAGE MODEL; 5.2 FINAL STAGE MODEL; 5.3 ENTRAPPED GASES AND DENSIFICATION; 5.4 SINTERING PRESSURE AT FINAL STAGE SINTERING; 5.5 POWDER PACKING AND DENSIFICATION; 5.6 PRESSURE-ASSISTED SINTERING 5.7 CONSTRAINED SINTERING PROBLEMS; REFERENCES; PART III: GRAIN

GROWTH; 6. NORMAL GRAIN GROWTH AND SECOND-PHASE PARTICLES; 6.1 NORMAL GRAIN GROWTH; 6.2 EFFECT OF SECOND-PHASE PARTICLES ON GRAIN GROWTH: ZENER EFFECT; 7. GRAIN BOUNDARY SEGREGATION AND GRAIN BOUNDARY MIGRATION; 7.1 SOLUTE SEGREGATION AT GRAIN BOUNDARIES; 7.2 EFFECT OF SOLUTE SEGREGATION ON GRAIN BOUNDARY MIGRATION; 8. INTERFACE MIGRATION UNDER CHEMICAL INEQUILIBRIUM; 8.1 GENERAL PHENOMENA; 8.2 DRIVING FORCE OF DIFFUSION-INDUCED INTERFACE MIGRATION (DIIM); 8.3 QUANTITATIVE ANALYSIS OF DIIM 8.4 MICROSTRUCTURAL CHARACTERISTICS OF DIIM AND ITS APPLICATION 9. ABNORMAL GRAIN GROWTH; 9.1 PHENOMENOLOGICAL THEORY OF ABNORMAL GRAIN GROWTH IN SINGLE-PHASE SYSTEMS; 9.2 INTERFACIAL ENERGY ANISOTROPY AND ABNORMAL GRAIN GROWTH; 9.3 ABNORMAL GRAIN GROWTH IN CHEMICAL INEQUILIBRIUM; PROBLEMS; REFERENCES; PART IV: MICROSTRUCTURE DEVELOPMENT; 10. GRAIN BOUNDARY ENERGY AND SINTERING; 10.1 THE GRAIN BOUNDARY AS AN ATOM SOURCE; 10.2 EFFECT OF GRAIN BOUNDARY ENERGY ON PORE SHRINKAGE; 11. GRAIN GROWTH AND DENSIFICATION IN POROUS MATERIALS; 11.1 MOBILITY OF AN ISOLATED PORE 11.2 PORE MIGRATION AND GRAIN GROWTH 11.3 PORE/BOUNDARY SEPARATION; 11.4 MICROSTRUCTURE DEVELOPMENT IN A POROUS COMPACT; 11.5 SCALING LAW AT FINAL STAGE SINTERING; 11.6 MODIFICATION OF THERMAL CYCLE AND MICROSTRUCTURE DEVELOPMENT; PROBLEMS; REFERENCES; PART V: SINTERING OF IONIC COMPOUNDS; 12. SINTERING ADDITIVES AND DEFECT CHEMISTRY; 12.1 POINT DEFECTS IN CERAMICS; 12.2 FORMATION OF POINT DEFECTS BY ADDITIVES; 13. DENSIFICATION AND GRAIN GROWTH IN IONIC COMPOUNDS; 13.1 DIFFUSION AND SINTERING IN IONIC COMPOUNDS; 13.2 ELECTROSTATIC POTENTIAL EFFECT ON INTERFACE SEGREGATION 13.3 SOLUTE SEGREGATION AND GRAIN BOUNDARY MOBILITY

Sommario/riassunto

Sintering is the process of forming materials and components from a powder under the action of thermal energy. It is a key materials science subject: most ceramic materials and many specialist metal powder products for use in key industries such as electronics, automotive and aerospace are formed this way. Written by one of the leading experts in the field, this book offers an unrivalled introduction to sintering and sintering processes for students of materials science and engineering, and practicing engineers in industry. The book is unique in providing a complete grounding in the pr
