## CONTENTS

CHAP	TER	PAGE
	Preface	v
	PART I	
I	Introduction to the Accurate Determination of Lattice Spacings	3
	(i) Units of measurement	3
	(ii) The use of the Debye-Scherrer method	5
II	Application of Structure Determination and Lattice Parameter Measurement to the Examination of Equilibrium Diagrams	10
	(i) The disappearing-phase method of determining phase boundaries .	10
	(ii) The lattice-spacing method for determining phase boundaries in binary alloys	11
	(iii) The lattice-spacing method of determining phase boundaries in ternary alloys	14
	(iv) The use of high-temperature X-ray photography in the determination of phase boundaries	17
Ш	STRUCTURE DETERMINATION AND LATTICE SPACINGS IN THE THEORY OF ALLOY FORMATION	19
	(i) The size factor: atomic and ionic radius	20
	(ii) Interatomic distance and electronic configuration	22
	(iii) Lattice spacings of terminal solid solutions: size factors and valency effects	23
	(iv) Intermediate phases formed primarily for geometrical reasons .	30
	(v) The Brillouin zone concept	31
	(vi) Electron concentration and the Brillouin zone concept: intermediate phases	34
	(vii) Brillouin zone concept and solid-solution lattice spacings	44
IV	THE RELATIONSHIP OF LATTICE SPACINGS AND MAGNETIC PROPERTIES .	55
	(i) Ferromagnetism and interatomic distance	55
	(ii) Changes of lattice spacing during transitions involving ferromagnetism and antiferromagnetism	57
	(iii) Correlation of lattice spacing and magnetic property changes in ferromagnetics	64

X CONTENTS

CHAP	TER		F	AGE			
V	MISCELLANEOUS ASPECTS OF LATTICE-SPACING VARIATION .			68			
	(i) Thermal expansion	•		68			
	(ii) The influence of quenching stresses on lattice spacings			69			
	(iii) The influence of particle size on lattice spacing and crystal structu						
	(iv) Degree of long range order and lattice distortion .			72			
	(v) Lattice distortion of solid solutions and physical properties	٠,		72			
	(vi) Lattice spacing and superconductivity	•	٠.	73			
	(vii) Analysis of the composition of alloys			74			
	(viii) The use of density measurements			74			
	PART II						
VI	CRYSTALLOGRAPHIC DATA ON "STRUKTURBERICHT" TYPES .	•		79			
VII	TABULATED LATTICE SPACINGS AND DATA OF THE ELEMENTS .			123			
VIII	TABULATED LATTICE SPACINGS AND DATA OF INTERMEDIATE IN ALLOY SYSTEMS	PHAS	SES •	131			
ΙX	TABULATED LATTICE SPACINGS AND DATA OF BORIDES, CARBIDES, HY	DRIDE	S.				
12.	NITRIDES, AND BINARY OXIDES		,	218			
X	X CLASSIFICATION OF INTERMETALLIC PHASES ACCORDING TO STRUCTU						
	Туре	•		247			
XI	An Alphabetical Index of Work on Metals and Alloys	•		254			
ХII	ALPHABETICAL INDEX OF WORK ON BORIDES, CARBIDES, HYDRIDES, N	[ITRID]	ES,				
	AND BINARY OXIDES	•	••	895			