

## Contents

CONTRIBUTORS TO VOLUME 47 .....	vii
FOREWORD .....	ix
PREFACE I .....	xiii
PREFACE II .....	xv

### Homogeneous Nucleation and the Temperature Dependence of the Crystal-Melt Interfacial Tension

FRANS SPAEPEN

I. Introduction.....	1
II. The Equilibrium Interface .....	5
III. The Interface in an Undercooled Melt .....	8
IV. Application to the Analysis of Homogeneous Nucleation Experiments ...	20
V. Conclusions .....	27
Acknowledgments .....	28
Appendix A: Calculation of the Interfacial Tension as an Excess Quantity for a Curved Interface .....	28
Appendix B: Calculation of the Interfacial Tension for a General Spatial Variation of the Free Energy .....	30

### Cluster Approach to Order-Disorder Transformations in Alloys

D. DE FONTAINE

I. Introduction.....	33
II. Statement of Problem .....	38
III. Cluster Expansions .....	43
IV. Ground State Analysis .....	64
V. Configurational Free Energy .....	79
VI. ECI Calculations .....	108
VII. Selected Applications .....	130
VIII. Conclusions .....	174
Acknowledgments .....	176

### The Physics and Mechanics of Brittle Matrix Composites

A. G. EVANS AND F. W. ZOK

I. Introduction.....	181
II. Interfaces .....	192
III. Residual Stresses .....	203
IV. Fiber Properties .....	207
V. Matrix Cracking in Unidirectional Materials .....	218
VI. Matrix Cracking in 2-D Materials .....	236

VII. Stress Redistribution .....	247
VIII. Fatigue .....	255
IX. Creep .....	274
X. Conclusions .....	285

### **Defects at Surfaces and Interfaces**

R. C. POND AND J. P. HIRTH

I. Introduction .....	288
II. Crystallographic Tools and Methodology .....	293
III. Defects in Single Crystals .....	315
IV. Surface Discontinuities .....	321
V. Interfacial Discontinuities .....	330
VI. Interfaces Modeled as Dislocation Arrays .....	350
Acknowledgments .....	365

### **Giant Magnetoresistance in Magnetic Layered and Granular Materials**

PETER M. LEVY

I. Introduction .....	367
II. Survey of Experimental Data .....	375
III. Theoretical Formulations of Transport .....	391
IV. Sources of Magnetoresistance .....	397
V. Quantum Theory of Magnetoresistance .....	404
VI. Discussion of Results .....	449
VII. Future Directions .....	458
Acknowledgments .....	462

AUTHOR INDEX .....	463
SUBJECT INDEX .....	477
CUMULATIVE AUTHOR INDEX .....	487