

CONTENTS

PREFACE

ix

1. Elastic Properties of Rocks and Minerals

DONALD J. WEIDNER

1. Introduction	1
2. Ultrasonic Techniques	2
3. Brillouin Spectroscopy	13
4. Thermal Diffuse Scattering	23
References	28

2. Laboratory Measurement of Internal Friction in Rocks and Minerals at Seismic Frequencies

LOUIS PESELNICK AND HSI-PING LIU

1. Introduction	31
2. Characterization of Nonelastic Behavior of Solids	33
3. Experimental Methods and Associated Problems	38
4. Conclusions	52
References	53

3. Measurement of Rock Deformation at High Temperatures

D. L. KOHLSTEDT AND P. N. CHOPRA

1. Introduction	57
2. Deformation Apparatus	58
References	86

4. Diffusion Measurements: Experimental Methods

F. J. RYERSON

1. Introduction	89
2. Theory	91

3. Solutions to Fick's Second Law	92
4. Experimental Methods	94
5. Analytical Methods	106
6. Summary	124
References	127

5. Rock Fracture and Frictional Sliding

HARTMUT SPETZLER

1. Introduction	132
2. Single-Crack Propagation	132
3. Double Torsion Technique	134
4. Double Cantilever Beam Technique	138
5. Notched Bending Beam Technique	142
6. <i>In Situ</i> Measurements	146
7. Acoustic Emissions	153
8. Frictional Sliding	170
9. Permeability	173
References	181

6. Shock Wave Techniques for Geophysics and Planetary Physics

THOMAS J. AHRENS

1. Introduction	185
2. Impedance Match Solutions	193
3. Shock-Induced Dynamic Yielding and Phase Transitions	200
4. Shock Wave Velocity Measurements	203
5. Release Isentrope Experiments	209
6. Measurement of Sound Speed behind the Shock Front	222
7. Shock and Postshock Temperatures	228
References	233

7. The Multianvil Press

E. K. GRAHAM

1. Introduction	237
2. Design and Construction of Multianvil Presses	238

3. Pressure Cell-Sample Assemblies	249
4. Pressure Calibration and Accuracy	259
5. Conclusions: Experiments with Multianvil Systems	266
References	267
8. Thermal Conductivity of Rocks and Minerals	
K. HORAI AND T. SHANKLAND	
1. Thermal Conductivity	271
2. Radiative Thermal Conductivity	292
References	301
9. Experimental Methods in Rock Magnetism and Paleomagnetism	
M. FULLER	
1. Introduction	303
2. Fundamental Concepts in Rock Magnetism and Paleomagnetism	305
3. Experimental Methods of Paleomagnetism	331
4. Rock Magnetism	418
5. Concluding Comments	465
References	466
INDEX	473
CONTENTS OF VOLUME 24, PART B	477