

ILLUSTRATIONS

Figure 1.	Die or Punch Geometry	4
2.	Apparatus in Place	8
3.	Sample Geometry for Pressure Calibration	9
4.	Calibration (pressure)	10
5.	Sample Geometry for Oxide Densification Studies	11
6.	Polymorphism of Rare Earths as a Function of Atomic Number	17
7.	Weight Loss versus Temperature for βSmOOH	20
8.	Electron Micrographs of High Density MgO	26
9.	Electron Micrographs of High Density MgO	26
10.	Transmission Electron Micrograph of MgO	27
11.	Grain Size versus Temperature	28
12.	Knoop Hardness versus Temperature	29
13.	Knoop Hardness versus Grain Size	30
14.	Transparent MgO	32
15.	NiO Single Crystals	34
16.	Al_2O_3 Showing Two Different Areas	37
17.	Al_2O_3 Micrograph	38
18.	Sample Detail	44
19.	Block Diagram for Pulse-Echo Phase Comparison Mode ...	46
20.	Block Diagram for Pulse-Echo Phase Comparison Mode ...	46
21.	Block Diagram for Modified Phase Cancellation Mode	46

ILLUSTRATIONS (Cont'd)

Figure 22.	Block Diagram for Through Transmission	48
23.	Block Diagram for Resonance Techniques	48
24.	Sample Detail Preliminary Tests	50
25.	Sample Detail Preliminary Tests	51
26.	Instrumentation for Sound Velocity Studies	52
27.	Exploded View of High Pressure X-ray Camera	54
28.	High-Pressure Camera Installed	55
29.	X-ray Pattern of RbCl at 1 bar and 25 kilobars	57
30.	X-ray Pattern of RbCl at 40 and 60 kilobars	57
A-1	Stress Distribution during Installation of Ring C into A and B	67
A-2	Radial Displacement of i. d. of Ring C due to Ring C Installation	68
A-3	Stress Distribution during Installation of Ring D into A, B and C	70
A-4	Stresses Encountered during Installation of Center Assembly into A, B, C and D	73
A-5	(a) Stress Distribution due to 300,000 psi Internal Radial Pressure; (b) Final Stress Distribution	74
A-6	Final Stress Analysis of Die Assembly	76
A-7	Final Stress Analysis of Die Assembly with 300,000 psi Internal Radial Pressure	77
A-8	Schematic of High-Pressure Apparatus and Relative Hardness of Rings	78
A-9	Visually Observed Ring Imperfections	79