

**Volume 29**  
**Low Frequency Properties of Dielectric Crystals**

**Subvolume A**  
**Second and Higher Order Elastic Constants**

Introductory material

1	The elastic constants of crystals (A.G. EVERY, A.K. MCCURDY)	1
1.1	Introduction	1
1.1.1	Notation, units and abbreviations	1
1.1.2	Stiffness and compliance constants	2
1.1.3	Methods for the determination of the elastic constants	5
1.1.4	Secondary effects: thermal, electrical and magnetic conditions	6
1.1.5	Secondary effects: frequency	6
1.1.6	Temperature coefficients	7
1.1.7	Pressure coefficients	7
1.1.8	Accuracy and selection of data	8
1.1.9	Arrangement of tables and graphs	9
1.1.10	Notes on bibliography	9
1.2	Tables	11
1.2.1	Elastic constants $s$ , $c$	11
	Table 3. Cubic system. Elements	11
	Table 4. Cubic system. Alloys	17
	Table 5. Cubic system. Intermetallic compounds	51
	Table 6. Cubic system. Solid solutions	55
	Table 7. Cubic system. Binary compounds	66
	Table 8. Cubic system. Alums	82
	Table 9. Cubic system. Miscellaneous compounds	84
	Table 10. Cubic system. Incomplete sets of constants	101
	Table 11. Hexagonal system	105
	Table 12. Hexagonal system. Incomplete sets of constants	129
	Table 13. Hexagonal system. Non-crystalline materials	134
	Table 14. Trigonal system, 6 constants	139
	Table 15. Composition in wt % for the tourmalines of Table 14	154
	Table 16. Trigonal system, 6 constants. Incomplete sets of constants	155
	Table 17. Trigonal system, 7 constants	158
	Table 18. Tetragonal system, 6 constants	159
	Table 19. Tetragonal system, 7 constants	172
	Table 20. Tetragonal system. Incomplete sets of constants	175
	Table 21. Orthorhombic system, 9 constants	182
	Table 22. Orthorhombic system. Incomplete sets of constants	203
	Table 23. Orthorhombic system. Non-crystalline materials	209
	Table 24. Monoclinic system	210
	Table 25. Densities and compositions of soda-potash feldspars of Table 24	222
	Table 26. Monoclinic system. Incomplete sets of constants	219
	Table 27. Triclinic system	222

1.2.2	Temperature coefficients $T_c$	224
	Table 28. Cubic system. Elements	224
	Table 29. Cubic system. Alloys	227
	Table 30. Cubic system. Intermetallic compounds	233
	Table 31. Cubic system. Solid solutions	234
	Table 32. Cubic system. Binary compounds	237
	Table 33. Cubic system. Alums	242
	Table 34. Cubic system. Miscellaneous compounds	243
	Table 35. Hexagonal system	247
	Table 36. Trigonal system	251
	Table 37. Trigonal system, higher-order temperature coefficients of stiffnesses $c$	256
	Table 38. Values of $(c)_0$ and $(s)_0$ for use with temperature coefficients	259
	Table 39. Trigonal system, higher-order temperature coefficients of compliances $s$	260
	Table 40. Tetragonal system, 6 constants	261
	Table 41. Tetragonal system, 7 constants	265
	Table 42. Orthorhombic system	266
	Table 43. Monoclinic system	270
	Table 44. Triclinic system	271
1.2.3	Pressure coefficients $P_c$	272
	Table 45. Cubic system. Elements	272
	Table 46. Cubic system. Alloys, intermetallic compounds, and solid solutions	274
	Table 47. Cubic system. Binary compounds	277
	Table 48. Cubic system. Miscellaneous compounds, including alums	282
	Table 49. Hexagonal system	286
	Table 50. Trigonal system, 6 or 7 constants	288
	Table 51. Tetragonal system, 6 or 7 constants	290
	Table 52. Orthorhombic system	293
	Table 53. Monoclinic system	295
1.3	Figures	296
1.4	Bibliography	576
1.4.1	General references	576
1.4.2	Special references	579
2	The third and higher-order elastic constants (A.G. EVERY, A.K. MCCURDY)	635
2.1	Introduction	635
2.1.1	Notation, units and abbreviations	635
2.1.2	Theory and notation	635
2.1.3	Third-order coefficients of the various crystal classes	638
2.1.4	Macroscopic theory of higher-order constants	641
2.1.5	Methods for the determination of the third-order elastic constants	642
2.1.6	Applications and theoretical developments	644
2.1.7	The effect of temperature and electrical conditions on the third-order stiffnesses	645
2.1.8	The third-order compliances	645
2.1.9	Arrangement of tables and comments	645
2.1.10	Notes on bibliography	646
2.2	Tables of third-order stiffnesses	647
	Table 9. Cubic system VIIb. Ionic compounds and oxides	647
	Table 10. Cubic system VIIb. Semiconductors and insulators	648
	Table 11. Cubic system VIIb. Metals and alloys	649

	Table 12. Cubic system VIIb. Miscellaneous compounds including solid solutions	651
	Table 13. Cubic system VIIb. Combinations and partial sets of constants	653
	Table 14. Cubic system VIIa	655
	Table 15. Hexagonal system VIa	656
	Table 16. Hexagonal system VIb	656
	Table 17. Trigonal system Vb	657
	Table 18. Tetragonal system IVb	658
	Table 19. Orthorhombic system III	660
	Table 20. Monoclinic system II	661
	Table 21. Trigonal system Vb. Semiempirical estimates. Calcite-type compounds	662
	Table 22. Monoclinic system II. Temperature coefficients of the third-order stiffnesses	662
2.3	Tables of fourth-order stiffnesses	663
	Table 23. Cubic system VIIb. Fourth-order stiffnesses for metals. Complete sets	663
	Table 24. Fourth-order stiffnesses. Incomplete sets	664
	Table 25. Cubic system VIIb. Combinations of fourth-order stiffnesses	664
	Table 26. Hexagonal system VIb. Fourth-order stiffnesses	665
	Table 27. Hexagonal system VIb. Combinations of the fourth-order stiffnesses	665
2.4	Figures	666
2.5	Bibliography	674
2.5.1	General references	674
2.5.2	Special references	675
	Index of substances (See Vol. 30B)	
	Alphabetical index of element systems	
	Alphabetical index of names	

Second and Higher Order Elastic Constants/ Elastische  
Konstanten zweiter und höherer Ordnung

Every, A.G.; McCurdy, A.K.

1992, XIV, 743 p. 890 illus., Hardcover

ISBN: 978-3-540-54410-4