ement of these values. He invites any reader who disputes the accuracy of any of the values to provide him with improved information.

References are given for most of the values which have been significantly changed since the previous list.

References

ALEXANDROV, YU. A., VALAGUROV, A. M., MALISHEVSKI, E., MACHEKHINA, T. A. & SEDLAKOVA, L. N. (1968). *J. Inst. Nucl. Res.* P3, 4121.

CHADWICK, B. M., JONES, B. W., SARNESKI, J. E., WILDE, H. J. & YERKESS, J. (1971). *Z. Kristallogr.* **134**, 308.

COOPER, M. J. (1970). Private communication.

COPLEY, J. R. D. (1970). *Acta Cryst.* A26, 376.

COX, D. E. & MINKIEWICZ, Y. J. (1971). *Acta Cryst.* A27, 494.

KOESTER, L. & KNOPF, K. (1971). *Z. Naturforsch.* 26a, 391.

KREBS-LARSEN, F., LEHMANN, M. S. & SØTOFTE, I. (1971). *Acta Chem. Scand.* **25**, 1233.

KROHN, V. E. & RINGO, G. R. (1966). *Phys. Rev.* **148**, 1303.

LOOPSTRA, B. J. & RIETVELD, H. M. (1969). *Acta Cryst.* B25, 787.

MERIEL, P. (1970). *C. R. Acad. Sci. Paris, sér. B*, **270**, 560.

SHULL, C. G. (1968). *Phys. Rev. Letters.* **21**, 1585.

WANG, F. F. Y. (1970). *Acta Cryst.* A26, 377.

Acta Cryst. (1972). A28, 358

Sixth-order elastic coefficients in cubic crystals. By DAVID Y. CHUNG, *Department of Physics and Astronomy, Howard University, Washington, D.C. 20001, U.S.A.*

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The sixth-order elastic coefficients have been enumerated by the method of symmetry operations. For $n>5$ the conjecture of Krishnamurty [*Acta Cryst.* (1963), 16,839] that there should be (n^2-2n+3) nth-order elastic coefficients of a cubic crystal (with point group O_h) was shown to be incorrect.

The numbers of independent elastic coefficients of order two and three for all crystal classes have been derived by Bhagavantum & Suryanarayana (1949) from the character method. By the method of reduction of a representation, Jahn (1949) obtained identical results. Recently Jahn's (1949) method has been extended to fourth- and fifth-order elastic coefficents by Krishnamurty & Gopala-Krishnamurty (1968), and to sixth- and seventh-order coefficeints by Chung (1972). Krishnamurty (1963), in enumerating the forth-order elastic coefficients by the character method, has conjectured that the number of nth-order elastic coefficients, symmetric in all the n suffixes, of a cubic crystal (O_h point group) would be n^2-2n+3 $(n\geq 2)$; whereas for an isotropic solid (R^i_∞) would be n.

Krishnamurty & Appalanarasimham (1969) recently pointed out that there should not be n nth-order elastic coefficients of an isotropic solid for $n>5$. In this note, it is shown that the other conjecture, namely n^2-2n+3 constants for cubic crystals, does not hold true either for $n>5$.

It is known that the elastic energy should be invariant with respect to the crystal symmetry operations. Using this principle Hearmon (1953) obtained the independent coefficients for all crystal classes. We applied the same method to sixth-order coefficents for a cubic crystal. The resulting 32 independent coefficients and their equivalence are given in Table 1.

Table 1. *The 32 sixth-order elastic coefficients and their equivalence for a cubic crystal*

111111 = 222222 = 333333
111112 = 111113 = 122222 = 133333 = 222223 = 233333
111122 = 111133 = 112222 = 113333 = 222233 = 223333
111123 = 122223 = 123333
111144 = 222255 = 333366
111155 = 111166 = 222266 = 333344 = 333355 = 222244
111222 = 111333 = 222333
111223 = 111233 = 112223 = 112333 = 122233 = 122333
111244 = 111344 = 122255 = 133366 = 222355 = 233366
111255 = 111366 = 133344 = 222366 = 233355 = 122244
111266 = 111355 = 122266 = 133355 = 222344 = 233344
111456 = 222456 = 333456
112233
112244 = 112255 = 113344 = 113366 = 223355 = 223366
112266 = 113355 = 223344
112344 = 122355 = 123366
112355 = 112366 = 122344 = 122366 = 123344 = 123355
112456 = 113456 = 122456 = 133456 = 223456 = 233456
114444 = 225555 = 336666
114455 = 114466 = 224455 = 225566 = 334466 = 335566
115555 = 116666 = 224444 = 226666 = 334444 = 335555
115566 = 224466 = 334455
123456
124444 = 125555 = 134444 = 136666 = 235555 = 236666
124455 = 235566 = 134466
124466 = 125566 = 134455 = 135566 = 234455 = 234466
126666 = 135555 = 234444
144456 = 245556 = 345666
145556 = 145666 = 244456 = 245666 = 344456 = 345556
444444 = 555555 = 666666
444455 = 444466 = 445555 = 446666 = 555566 = 556666
445566

One notices that the number of independent coefficients 32 is quite different from $n^2-2n+3=27$ for $n=6$ predicted by Krishnamurity (1963). However, it agrees very well with the group theoretical prediction of Chung (1972).

References

BHAGAVANTAM, S. & SURYANAYANA, D. (1949). *Acta Cryst.* **2**, 21.

CHUNG, D. Y. (1972). *Acta Cryst.* In the press.

HEARMON, R. F. S. (1953). *Acta Cryst.* **6**, 331.

JAHN, H. A. (1949). *Acta Cryst.* **2**, 30.

KRISHNAMURTY, T. S. G. (1963). *Acta Cryst.* **16**, 839.

KRISHNAMURTY, T. S. G. & APPALANARASIMHAM, V. (1969). *Acta Cryst.* A25, 638.

KRISHNAMURTY, T. S. G. & GOPALA-KRISHNAMURTY, P. (1968). *Acta Cryst.* A24, 563.