Cd(S, Te)

X-ray

P.L. Smith

THE HIGH-PRESSURE STRUCTURES OF CADMIUM SULPHIDE AND CADMIUM TELLURIDE

P. L. SMITH and J. E. MARTIN
Basic Physics Division, National Physical Laboratory, Teddington, Middlesex

Received 12 July 1963

X-ray diffraction patterns have been obtained from these two materials using opposed diamond anvils. Cadmium sulphide in the wurtzite form was studied to investigate the electrical transition observed by Samara and Drickamer [1]. The new form was found to have the rock-salt structure with an a_0 of 5.42 ÅU, corresponding to a value of $-\Delta V/V$ of 21%. Rooymans [2] has recently published a value of 5.30 ÅU for the lattice constant of CdS in the rock-salt structure. Our sample was subjected to a nominal pressure of 200 kb, but no new lines were observed. This is in agreement with the results given in ref. [1] which show that no sudden transition occurs below 600 kb.

Cadmium telluride, normally in the zinc-blende structure, was found to transform first into the rock-salt structure with an a_0 value of 5.92 AU and then, above 90 kb, to a diatomic analogue of the white tin structure. The values of $-\Delta V/V$ are 24% for the first transition and 3% for the second. The lattice constants of this phase were a = 5.86 ÅU, c = 2.94 ÅU giving c/a = 0.50. At 200 kb pressure c/a had increased to 0.526 (a = 5.62 ÅU), in common with other "white tin" structures.

Full experimental and X-ray data will be given in a later publication [3].

1) G.A. Samara and H.G. Drickamer, J. Phys. Chem. Solids 23 (1962) 457.
2) C.J.M. Rooymans, Physics Letters 4 (1963) 186.
3) N.B. Owen, P.L. Smith, J.E. Martin and A.J. Wright, to be published.

* * * * *