

MELTING CURVES OF SELENIUM UP TO 40 KILOBARS
AND OF SULFUR UP TO 90 KILOBARS

by

Miss C. SUSSE, R. EPAIN and B. VODAR

(Laboratoire des Hautes Pressions, C.N.R.S., -BELLEVUE-France)
1, Place Aristide Briand, 1

(S. et O.)

The measurements were made in equipment of the belt type by the thermal analysis method.

In the case of sulfur we met with some difficulties which ~~were~~ probably related to its very low thermal conductivity. However very good melting signals for this element were obtained 1) by adding to the main heating element (a graphite tube, see 1st view) two secondary elements which render the temperature more uniform throughout the sample and 2) by locating the thermocouple junction in direct contact with the sulfur.

Individual runs (and cells) were made for each point of the melting curve of sulfur because condition 2) did not allow ~~second~~ meltings of the samples as the liquid sulfur could not be confined inside its platinum capsule.

In the case of selenium, we have been able to use tight capsules, the thermocouple junction being located in contact with their external surface, and to get several points of the curve in the same experiment.

The results on selenium agree satisfactorily with previous results from BABB (1) in the low pressure range (10 kb) and with later results from DEATON and BLUM (2) obtained by differential thermal conductivity analysis (see 2nd view).

In the case of sulfur (see 3rd view), the results can easily be related to previous results covering the range 0-15 kb.

...../.....

Moreover, there seems to be a correlation between the maximum of the melting curve at 86 kb and 680°C and the results of shock wave experiments by BERGER, (Miss)JOIGNEAU and BOTTET (3). According to these authors, sulfur would be molten to a metallic liquid (that is to a denser state) in this pressure-temperature range.

However our results disagree with subsequent data from BLUM and DEATON and from BAAK (4), our melting curve being located approximately at ~~midway~~ between the curves obtained by these authors.

More experimental data is needed before one can give a satisfactory explanation of these discrepancies.

- (1) S.E. BABB, University of Oklahoma, Dept Physics, Norman, Oklahoma
- (2) B.C. DEATON, F.A. BLUM, Applied Science Lab., General Dynamics
Fort Worth, Texas
- (3) J. BERGER, Melle S. JOIGNEAU, G. BOTTET, Commissariat
à l'Energie Atomique, France
- (4) T. BAAK Owens Illinois Technical Center, Toledo, Ohio