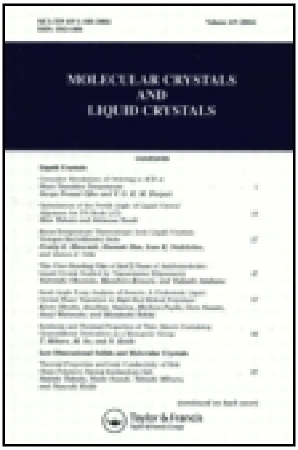

Molecular Crystals and Liquid Crystals
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/gmcl16

Research Note: The Melting Curve of C_6Cl_6, to 22.5 kbar

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Version of record first published: 28 Mar 2007.

Mol. Cryst. Liq. Cryst., 1976, Vol. 35, pp. 357–359

Research Note

The Melting Curve of C_6Cl_6 to 22.5 kbar

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(*Received March 23, 1976*)

The melting curve of C_6Cl_6 was determined to 22.5 kbar. The Simon equation $P = 0.268[(T/500)^{6.845} - 1]$ fits the data with a standard deviation of 4.3°C.

The melting curve of hexachlorobenzene has previously been determined to ~4 kbar in a hydrostatic device.[1] The compressibility was also determined to 45 kbar.[2]

Hexachlorobenzene was obtained from BDH and was a microanalytical reagent grade material. Pressures were generated using a piston-cylinder device.[3,4] Melting was studied by differential thermal analysis (D.T.A.) using chromel-alumel thermocouples. The samples were contained in copper capsules with no evidence of contamination. The complete procedure has been described elsewhere.[5,6]

Figure 1 shows the melting curve of C_6Cl_6 to 22.5 kbar. Only a few melting signals were obtained before decomposition occurred in each of the experiments. The decomposition process could easily be recognised by the fluctuating behaviour of the differential trace once decomposition had started. The decomposition after only ~4 signals made it difficult to obtain accurate values for the friction correction, and the results are thought to be accurate to ±1 kbar. The pressure was initially raised to ~20 kbar in each run to ensure sealing of the capsule. Only melting signals are plotted in Figure 1, as slight, variable, supercooling was encountered (2–10°C).

The agreement between the present work and the previous hydrostatic work[1] is good. The melting curve after rising strongly with an initial slope of ~70°C/kbar shows a fair amount of curvature until the slope is ~6°C/kbar at 22 kbar where C_6Cl_6 melts at ~690°C. The melting curve was fitted

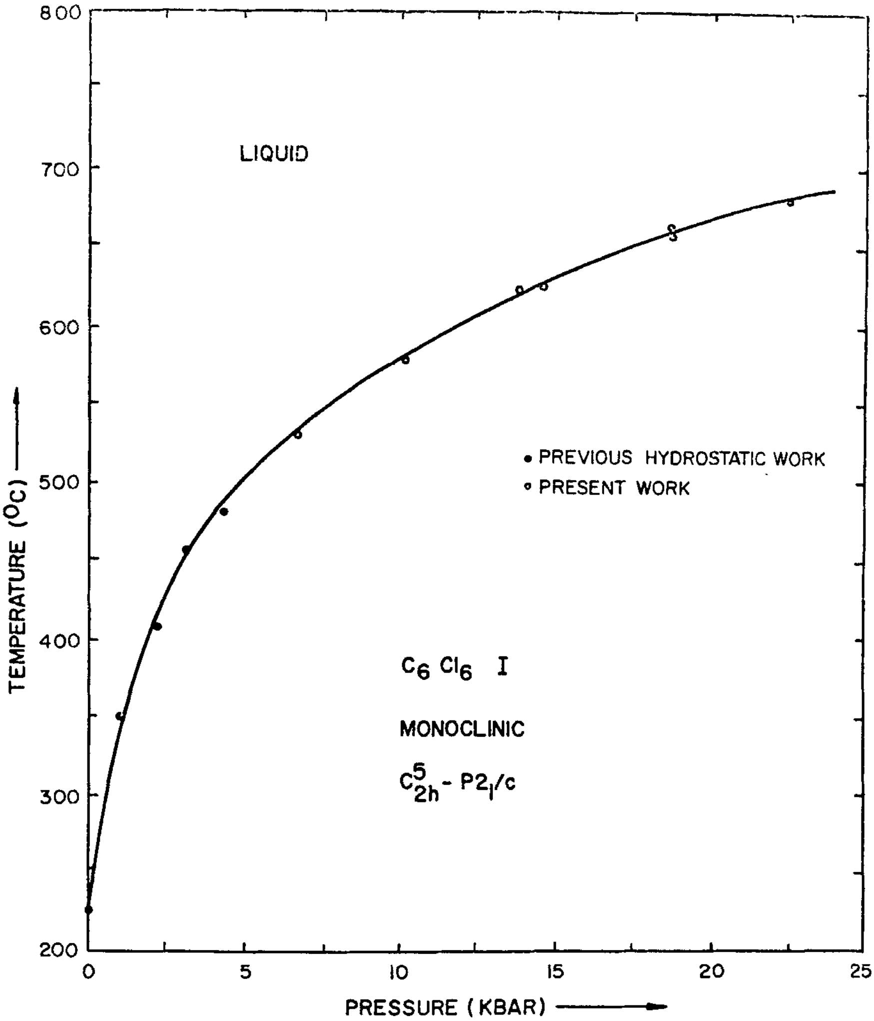

FIGURE 1 The melting curve of C_6Cl_6 to 22.5 kbar.

using the Simon equation[7]

$$P = A[(T/T_0)^c - 1]$$

where $T(K)$ is the melting point at P(kbar), $T_0(K)$ is the melting temperature at atmospheric pressure and A and c are adjustable constants, determined by means of Babb's method.[8] The equation

$$P = 0.268\,[(T/500)^{6.845} - 1]$$

fits the present data with a standard deviation of 4.3°C.

If the previous hydrostatic data[1] is fitted to the Simon equation and extrapolated to 20 kbar, a value of 685°C is found for the melting temperature. The actual experimental value at 20 kbar is 670°C, in good agreement.

Acknowledgements

The author would like to thank Prof. W. Klement, Jr., Drs. P. W. Richter and A. Wolbarst for helpful discussions.

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