Journal of Fluorine Chemistry, 8 (1976) 467 – 469

Received: May 26, 1976

PHYSICAL PROPERTIES OF HEXAFLUOROBENZENE

A.H.N. MOUSA*

Department of Chemical Engineering, The Ohio State University, Columbus, Ohio 43210 (U.S.A.)

SUMMARY

The critical properties of hexafluorobenzene were measured, and compared with the most reliable values reported in literature. The vapour pressure was determined from 226°C to the critical point and correlated by an equation of state.

INTRODUCTION

The study of properties of aromatic polyfluoro-compounds is warranted by the potential industrial significance of these compounds and by their theoretical interest [1, 2]. For hexafluorobenzene some measurements of vapour pressure and critical properties were reported by Evans and Tiley [3], Patrick and Prosser [4], McCoubrey and Cheng [5], Counsell et al. [6].

The objective of this paper is to measure vapour pressure data and correlate them with an equation of state. Also to measure the critical temperature, pressure and density and compare them with the most reliable values selected by Kudchodler, Alani and Zwolinski [7].

---

* Now staff member at the Chemical Engineering Department, University of Khartoum, Sudan.

EXPERIMENTAL

Hexafluorobenzene was supplied by Pierce Chemical Company who stated that the purity is 98%. The sample was further purified by placing in contact with activated molecular sieves to absorb traces of moisture and was then degassed by subjecting the sample to a cycle of freezing, pumping, melting and freezing. The degassed sample was kept in a flask attached to a high vacuum train and surrounded by a mixture of dry ice and acetone. The purity was checked by a determination of the pressure difference between the bubble and dew pressures. The difference was found to be negligible.

APPARATUS AND PROCEDURE

The apparatus and methods used for the measurements have been described in a previous publication [8].

RESULTS

The vapour pressure data have been best fitted, by the method of least squares, to the following equation:

$$\log_{10}(P/lb_f in^{-2}) = 6.02128 - 1724.6696/(T/K)$$

The crytical values are shown in Table I together with the most reliable values recommended by Kudchodler et al. [7].

TABLE 1

Critical values of hexafluorobenzene

Critical temperature (^{o}C)	Critical pressure (Psia)	Critical density (g/cm^3)	Reference
243.32	481.29	0.4934	This work
242.70	-	-	5
245.00	-	-	4
243.57	479.24	-	6
242.90	259.25	-	3

DISCUSSION

As shown in Table I the critical properties are in good agreement with those chosen by Kudchodler et al. [7] as the most reliable values in literature.

When the vapour pressure equation obtained here was applied to the data reported by Evans and Tiley 3 a good agreement was obtained in the temperature range of this equation.

ACKNOWLEDGMENT

The author is very grateful to Professor W.B. Kay for his great help during this study.

REFERENCES

1 Symposium, J. Chem. Eng. Data, 6 (1961) 76.
2 J.C. Tatlow, Endeavour, 22 (1963) 89.
3 F.D. Evans and P.F. Tiley, J. Chem. Soc. (B), (1966) 134.
4 C.R. Patrick and G.S. Prosser, Trans. Faraday Soc., 60 (1964) 700.
5 J.C. McCoubrey and D. Cheng, J. Chem. Soc., (1963) 4993.
6 J.F. Counsell, J.H. Green, J.L. Hales and J.F. Martin, Trans. Faraday Soc., 61 (1965) 212.
7 A.P. Kudchodler, G.W. Alani and B.J. Zwolinski, Chem. Rev., 68 (1968) 659.
8 A.H.N. Mousa, J. Fluor. Chem., 6 (1975) 221.