Note

The Vapor Pressure of Normal Butyl Chloride

By C. William Lenth

Materials and Apparatus.—The *n*-butyl chloride used in this work was prepared from *n*-butyl alcohol by the method of Norris.[1] Inasmuch as the product obtained by this method was contaminated with sulfur dioxide, a thorough washing with a dilute solution of sodium hydroxide preceded the washing and drying suggested in the original procedure. It was then fractionally distilled through a 30 × 1.5 cm. column. The fraction used in this work distilled at 77.5 ± 0.1°.

The apparatus is a slight modification of that used by Smith and Menzies.[2] Instead of the small bulb used by Smith and Menzies, a 1–2 mm. capillary ebullition tube closed about 1 cm. from the lower end was employed. This was used in the same manner as the bulb except that there was no liquid in it. The thermometer was calibrated at four different points from 0 to 100°. The maximum correction was 0.2°.

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T, °C.	*P*, cm. Hg obs.	*P*, cm. Hg calcd.	Deviation from calcd., %	*T*, °C.	*P*, cm. Hg obs.	*P*, cm. Hg calcd.	Deviation from calcd., %
12.5	5.65	5.60	0.89	63.5	46.5[a]	46.5	0.00
25.0	10.2	9.78	4.40	65.0	48.8	49.2	−0.81
31.0	12.8	12.8	0.00	66.0	50.5[a]	50.8	−0.59
42.0	20.4	20.5	−0.49	71.0	60.3	60.5	−0.33
49.5	27.8	27.5	1.09	73.0	65.0[a]	64.9	0.15
59.0	39.6	39.5	0.25	77.5	76.0	76.0	0.00
						Average	0.75

[a] These points were determined by the Ramsay–Young method, *J. Chem. Soc.*, **47**, 42 (1885).

The latent heat of vaporization calculated from these data with the aid of the integrated form of the Clausius–Clapeyron equation is 8090 cal. per mole. Using this value for the latent heat an empirical equation for the vapor pressure may be derived

$$2.303 \log P = -8090/1.99T + 6.912$$

where P is the pressure in cm. and T is the absolute temperature.

The data in the third column of the table were calculated by this empirical formula.

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(1) J. F. Norris, "Organic Syntheses," 1925, Vol. V, p. 27.
(2) Smith and Menzies, This Journal, **32**, 897 (1910).