THE FUSION CURVES OF THE SYSTEMS Br_2-CHCl_3, Br_2-CCl_4, AND $CHCl_3-CCl_4$.

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The fusion curves of the systems between bromine and organic liquids were determined by Maass and McIntosh.(1) In the present paper the results of measurements of the freezing points of the systems Br_2-CHCl_3 and Br_2-CCl_4 as well as $CHCl_3-CCl_4$ are reported.

The pure samples of bromine, chloroform, and carbon tetrachloride from Merck were used. The carbon tetrachloride was further purified by crystallization, and the chloroform by shaking with sulphuric acid and then with potassium dichromate solution. The temperatures were measured by a pentane thermometer bearing the correction table from Physikalisch-Technische Reichsanstalt. About 20—30 grams of the liquid were taken in each measurement, and the temperature were recorded every 30 seconds. The freezing point was determined by means of the cooling curve thus drawn. The results are shown in Tables 1, 2 and 3. These data are depicted in Figures 1, 2 and 3.

(1) Maass and McIntosh, *J. Am. Chem. Soc.*, **34** (1912), 1273.

Table 1. Br_2—$CHCl_3$.

Mole% of Br_2	Freezing point	Mole % of Br_2	Freezing point
0.00	−63.5°C.	28.26	−45.7
3.78	−66.2	33.48	−41.0
8.72	−68.9	41.17	−35.0
10.92	−70.3	44.97	−32.7
12.66	−71.5	52.52	−27.8
14.15	−67.4	62.03	−23.5
15.14	−63.8	71.86	−18.8
17.85	−60.0	82.43	−14.5
19.23	−56.8	89.94	−12.0
20.72	−53.5	93.97	− 9.7
24.35	−48.2	100.00	− 7.3

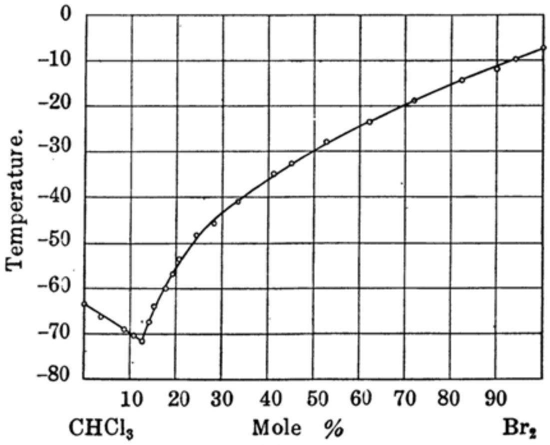

Fig. 1.

Table 2. Br_2—CCl_4.

Mole % of Br_2	Freezing point	Mole % of Br_2	Freezing point
0.00	−22.9°C.	32.08	−38.5
1.40	−24.3	40.60	−32.1
4.80	−30.0	46.50	−28.1
8.68	−36.4	55.32	−25.0
10.99	−42.0	62.11	−22.1
12.74	−44.6	67.49	−20.0
15.10	−47.5	74.38	−17.5
17.26	−47.6	79.78	−15.2
20.05	−46.7	85.09	−13.1
21.49	−45.8	92.20	−10.6
22.81	−44.8	96.50	− 8.9
26.15	−40.8	100.00	− 7.3

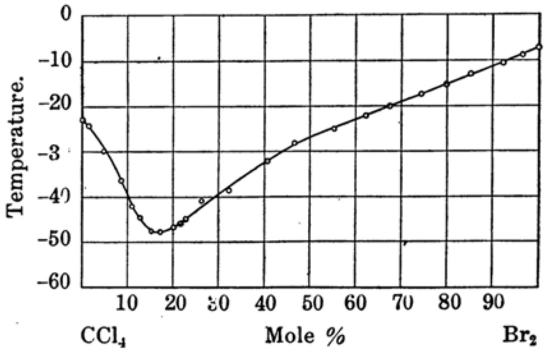

Fig. 2.

Table 3. $CHCl_3$—CCl_4.

Mole % of $CHCl_3$	Freezing point	Mole % of $CHCl_3$	Freezing point
0.00	−22.9°C.	51.03	−77.5
4.90	−28.5	53.96	−80.0
8.38	−35.5	56.12	−83.2
11.10	−40.8	58.30	−85.7
14.30	−45.3	59.13	−86.9
16.31	−52.0	60.51	−86.4
18.21	−55.7	62.24	−85.1
19.48	−55.3	65.25	−83.0
20.37	−55.8	67.84	−82.1
21.40	−56.5	71.23	−79.8
23.67	−57.1	76.61	−76.8
26.25	−58.2	80.34	−74.7
31.11	−61.3	85.58	−71.5
36.62	−65.2	89.69	−70.1
41.57	−69.1	92.78	−66.8
44.65	−71.7	96.15	−65.4
47.54	−74.6	100.00	−63.5

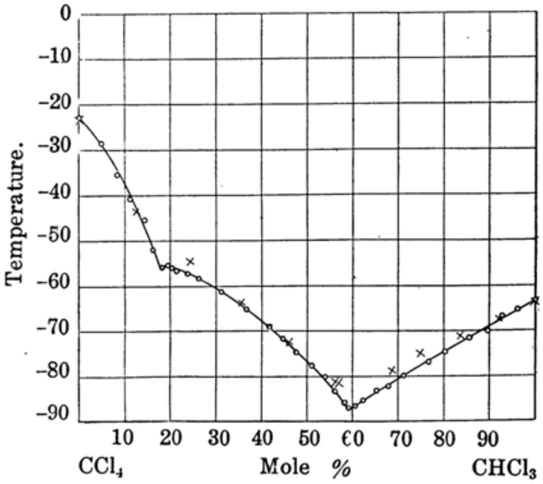

Fig. 3.

We see, from these figures, that there is no compound in the systems Br_2-CHCl_3 and Br_2-CCl_4. In the system $CHCl_3-CCl_4$, however, there is one compound $CHCl_3 \cdot 4CCl_4$, its melting point being −55°C.

Table 4.

$CHCl_3-CCl_4$.

(Int. Crit. Tab.)

Weight % of CCl_4	Mole % of $CHCl_3$	Freezing point
100	0	−23.4°C.
90	12.5	−43.5
80	24.4	−54.5
70	35.6	−63.7
60	46.2	−72.4
50	56.3	−81.0
49.4	56.9	−81.4 (Eutectic pt.)
40	68.8	−78.6
30	75.0	−75.0
20	83.7	−71.2
10	92.1	−67.5
0	100.0	−63.7

The freezing points of the system $CHCl_3-CCl_4$ measured by Kanolt[(2)] are given in the "International Critical Table." The data are shown in Table 4, and by crosses in Fig. 3.

The freezing point of carbon tetrachloride has recently been found to be −22.87°C. by Johnston and Long[(3)] which coincides with our value −22.9°C., but differs considerably from Kanolt's value −23.4°C.

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(2) International Critical Tables, Vol. IV (1928), p. 98.

(3) Johnston and Long, *J. Am. Chem. Soc.*, **56** (1934), 31.