

Ternary Solubility Curves of the Systems *n*-Hexane-Water-Alcohols

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Synopsis

Solubility curves were observed for the systems *n*-Hexane-Water-Alcohols at 20°C and 30°C.

In this paper the solubility curves were determined at 20°C and 30°C for the ternary lipid systems of *n*-hexane and water with methanol, ethanol, *n*-propanol, *i*-propanol, *n*-butanol and *i*-butanol.

Alcohols and *n*-hexane were reagent grade and were used without further purification.

Their specific gravities are listed in the following table.

Material	Gravity (20°C/20°C)
<i>n</i> -hexane	0.6594
methanol	0.7910
ethanol	0.7898
<i>n</i> -propanol	0.8046
<i>i</i> -propanol	0.7842
<i>n</i> -butanol	0.8132
<i>i</i> -butanol	0.8034

The solubility curves were obtained by usual procedure. The method consists of titrating the third component into known homogeneous binary mixtures to the cloud point.

The binary mixtures were placed in a constant temperature bath at 20°C or 30°C and titrated with a third component at room temperature.

As the cloud point was approached, each sample was agitated and leaved for several minutes and then the third component was dropped carefully until the mixture became cloudy.

The results are recorded in Tables 1, 2, and Figs. 1—4.

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Table 1 Data for solubility curves at 20°C (wt. %)

<i>n</i> -hexane	water	methanol	<i>n</i> -hexane	water	ethanol
38.6	0.1	61.3	94.9	9.6	4.5
35.3	0.2	64.5	86.7	0.8	12.5
30.0	0.8	69.2	76.9	1.0	22.1
26.1	1.4	72.5	65.7	2.8	31.5
23.0	2.0	75.0	55.4	3.6	41.0
20.5	2.6	76.9	46.7	4.0	49.3
16.9	3.8	79.3	38.1	3.4	58.5
8.7	6.0	85.3	30.7	7.5	61.8
7.4	10.0	82.6	26.0	9.0	65.8
3.4	17.3	79.3	22.6	10.3	67.1
3.2	20.1	76.7	19.8	11.6	68.6
2.5	24.3	73.2	11.0	18.7	70.3
2.0	30.4	67.6	7.1	23.0	69.9
1.4	44.8	53.8	4.8	29.1	66.1
0.9	54.9	44.2	3.4	39.1	57.5
			1.4	47.8	50.8
			1.3	60.1	38.6
			1.1	68.8	30.1
			0.9	81.1	18.1
			0.3	97.9	1.8
<i>n</i> -hexane	water	<i>n</i> -propanol	<i>n</i> -hexane	water	<i>i</i> -propanol
94.7	0.7	4.6	93.4	2.1	4.5
81.7	2.2	16.1	82.1	1.5	16.4
70.0	4.0	26.0	72.6	3.2	24.2
63.8	5.1	31.1	64.5	4.8	30.7
45.4	10.2	44.4	54.0	7.0	39.0
34.7	14.4	50.9	44.7	10.6	44.7
27.9	17.8	54.3	33.6	15.1	51.3
23.2	20.0	56.8	27.3	18.2	54.5
19.5	23.3	57.2	22.6	21.4	56.0
18.0	24.4	57.6	19.3	23.7	57.0
16.0	27.1	56.9	16.8	25.8	57.4
13.9	29.8	55.3	14.8	27.6	57.6
11.5	34.4	54.1	13.1	29.3	57.6
10.7	35.3	54.0	9.5	35.2	55.3
8.5	42.2	49.3	5.0	44.5	50.5
5.8	53.3	40.9	2.6	54.5	42.9
1.2	63.2	35.6	1.0	69.0	30.0
1.0	71.4	27.6	0.8	80.8	18.4
0.8	89.2	10.0	0.7	86.9	12.4
<i>n</i> -hexane	water	<i>n</i> -butanol	<i>n</i> -hexane	water	<i>i</i> -butanol
92.0	3.5	4.5	95.2	0.2	4.6
80.8	3.3	15.9	89.3	0.7	10.0
71.0	3.1	25.9	79.8	0.8	19.4
64.9	3.0	32.1	66.3	1.4	32.3
55.4	3.6	41.0	49.3	2.6	48.1
48.4	3.7	47.9	38.8	4.3	56.9
37.9	6.1	56.0	30.3	5.3	64.4
31.0	7.9	61.1	20.7	7.5	71.8
20.3	9.6	70.1	10.8	9.9	79.3
15.9	11.2	72.9	0.2	13.8	86.0
10.1	15.0	74.9			
0.6	24.1	75.3			

Table 2 Data for solubility curves at 30°C (wt. %)

<i>n</i> -hexane	water	methanol	<i>n</i> -hexane	water	ethanol
37.8	0.7	61.5	95.0	0.5	4.5
36.3	1.0	62.7	86.7	0.8	12.5
34.5	1.0	64.5	79.5	1.4	19.1
28.5	1.9	69.6	70.4	2.6	27.0
24.9	2.5	72.6	63.5	3.0	33.5
22.0	3.1	74.9	55.7	4.2	40.1
19.8	3.6	76.6	42.9	5.6	51.5
17.8	4.5	77.7	34.7	7.0	58.3
16.0	5.1	78.9	29.0	8.3	62.7
14.7	5.7	79.6	24.8	9.8	65.4
10.0	7.5	82.5	21.6	11.0	67.4
7.5	10.5	82.0	19.0	12.4	68.6
3.8	16.2	80.0	14.4	15.6	70.0
3.0	24.3	72.7	10.8	18.8	70.5
2.4	27.9	69.7	7.6	23.2	69.2
1.8	32.7	65.5	5.4	29.7	64.9
1.1	42.4	56.5	3.3	40.4	56.3
			2.7	54.3	43.0
<i>n</i> -hexane	water	<i>n</i> -propanol	1.9	64.7	33.4
96.0	0.3	3.7	1.8	78.2	20.0
90.8	0.3	8.9	1.5	88.5	10.0
82.8	1.0	16.2	1.6	98.0	0.4
75.9	1.8	22.3			
67.2	3.3	29.5	<i>n</i> -hexane	water	<i>i</i> -propanol
50.8	9.5	39.7	94.9	0.6	4.5
38.1	13.5	48.4	86.6	1.1	12.3
29.5	17.1	53.4	79.5	1.5	19.0
24.2	20.4	55.4	64.9	3.0	32.1
20.3	23.3	56.4	54.5	4.0	41.4
17.3	26.2	56.5	42.8	6.3	50.9
15.0	28.5	56.5	31.9	11.9	56.2
10.5	34.4	55.1	26.1	15.5	58.4
7.5	42.4	50.1	21.4	20.5	58.1
4.3	54.6	41.1	14.5	28.7	56.8
2.6	62.7	34.7	10.1	34.7	55.2
1.9	78.1	20.0	6.5	43.5	50.0
1.8	98.1	0.1	2.8	53.9	43.3
			1.8	68.2	30.0
<i>n</i> -hexane	water	<i>n</i> -butanol	1.7	84.0	14.3
94.3	1.0	4.7	1.6	98.3	0.1
85.6	1.7	12.7			
65.3	2.5	32.2	<i>n</i> -hexane	water	<i>i</i> -butanol
55.2	4.0	40.8	95.0	0.4	4.6
44.9	5.0	50.1	86.5	0.8	12.7
42.5	4.9	52.6	79.6	1.0	19.4
34.1	6.9	59.0	70.2	1.8	28.0
28.1	8.2	63.7	59.5	2.8	37.7
23.6	8.1	68.3	45.4	3.7	50.9
17.0	10.6	72.4	40.1	3.9	56.0
12.2	12.8	75.0	36.3	5.2	58.3
7.5	14.8	77.7	30.3	6.3	63.4
4.2	17.2	78.6	25.2	7.2	67.6
1.1	20.3	78.7	21.9	7.6	70.5
			20.2	8.9	70.9
			14.9	10.2	74.9
			10.9	11.6	77.5
			7.0	13.0	80.0
			4.0	14.6	81.4
			2.3	15.6	82.1
			0.5	16.8	82.7

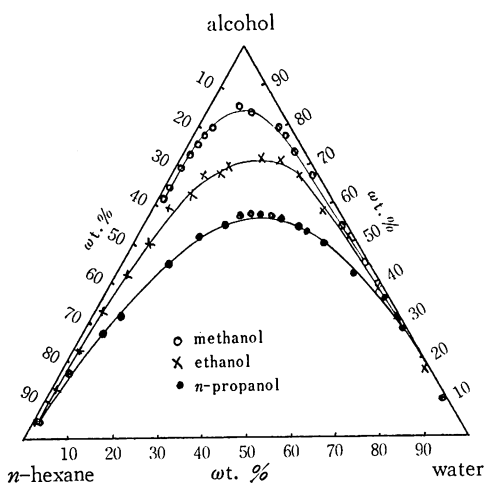


Fig. 1 Solubility curves for *n*-hexane-water-methanol, ethanol, *n*-propanol at 20°C

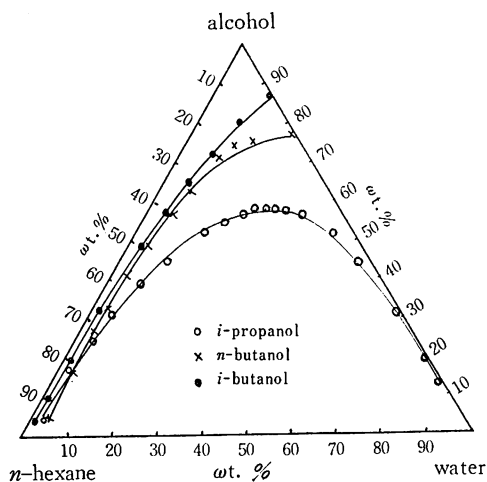


Fig. 2 Solubility curves for *n*-hexane-water-*i*-propanol, *n*-butanol, *i*-butanol at 20°C

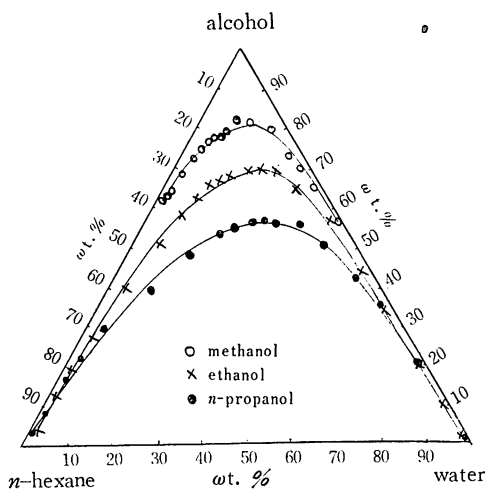


Fig. 3 Solubility curves for *n*-hexane-water-methanol, ethanol, *n*-propanol at 30°C

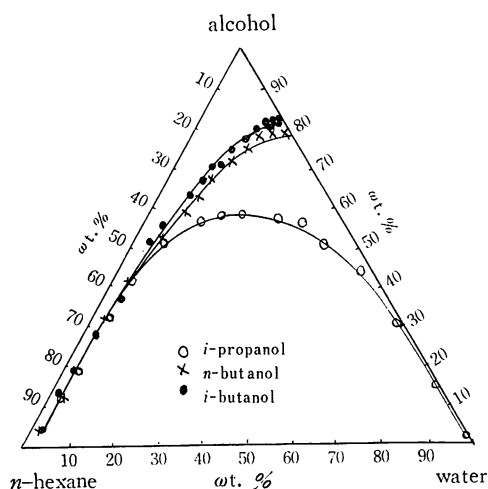


Fig. 4 Solubility curves for *n*-hexane-water-*i*-propanol, *n*-butanol, *i*-butanol at 30°C

We thank to Miss Ohtani for her help in experiments.

References

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- (2) H. Tōhata et al, Kagakukōgaku Jikken p. 57

(昭和45年12月25日受理)