SOLUBILITIES OF INORGANIC AND ORGANIC COMPOUNDS

SOLUBILITIE OF INORGANIC AND ORGANIC COMPOUNDS

VOLUME 2

Ternary and
Multicomponent Systems
PART 2

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and

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SOLUBILITIES OF
INORGANIC AND ORGANIC COMPOUNDS

INTRODUCTION

Volume II, parts one and two, is a selection from the International Chemical Literature on the Solubilities of Elements, Inorganic Compounds, Metallo-organic Compounds and Organic Compounds in *Ternary and Multicomponent Systems.*

The compounds are named in accordance with the recommendations of the Commission on Nomenclature of Organic and Inorganic Chemistry of the International Union of Pure and Applied Chemistry.

GUIDE TO THE PRESENTATION OF VOLUME TWO, PARTS 1 AND 2.

The *solubility* data are presented in the form of Tables which are numbered consecutively in the top left hand corner, these numbers locating the position of any required compound listed in the Indexes published at the end of Volume II, Part 2, pp. 1796–*et seq.* The references to the original literature from which the data has been selected are arranged numerically on pp. 1762–1795 in Volume II, Part 2. The numbers referring to this literature are in square brackets in the top right hand corner of each Table heading.

Tables 1–4955 deal with Ternary Systems and Tables 4956 *et seq.* are devoted to Multicomponent Systems. The arrangement of the data in both categories is the same, namely the first Tables are systems in which an Element is a component. These are followed by data for systems containing Inorganic Compounds then Metallo-organic Compounds. Next in order are systems in which water is one component, the remaining components being organic, followed finally in the Ternary section only by systems, all the components of which are Organic substances.

The detailed arrangement of the Tables within each of these groups is as follows:—

The sequence of Tables comprising Elements, Inorganic compounds and metallic salts of organic acids are determined by the position of the element or the cation corresponding to the element in the Periodic Classification of the Elements.

In accordance with the general principle, the ion of ammonia is positioned at the end of the first Group, the data for systems containing salts of Lithium, Sodium, Potassium etc. being presented in that order.

The compounds of each element are arranged in the following order:—First the oxides and their hydrates, then the salts of the

halogen acids in order of increasing atomic weights of the halogens (F, Cl, Br, I) followed by salts of other acids arranged according to the respective elements in the Periodic Table. The position of the salts of organic acids with the same element had been determined in numerical order by the number of carbon, hydrogen, nitrogen, oxygen and other elements in the acid radical of the compound.

When there are two salts in one system, e.g. a sodium salt and a calcium salt, then the position of that Table is determined by the sodium salt, i.e. the element belonging to the Group in the Periodic Classification with the lower atomic number. If a double salt is present in a system, then its place is determined by the element with the lower atomic number. Inorganic acids and compounds with a complex anion are arranged according to the position of the central element in the Periodic Table (e.g. acids containing nitrogen are followed by acids containing phosphorus, arsenic, etc.).

Salts of organic bases with inorganic and also organic substances are arranged within each group in numerical order by the number of carbon, hydrogen, nitrogen, oxygen and other elements in the molecules of these compounds. Thus the position of the system Ethanol C_2H_6O – Ethylene Glycol $C_2H_6O_2$ – Xylene C_8H_{10} is determined by the Ethanol. The order of systems with a common component which is decisive for their position, is determined by the chemical formula of the component next in order of complexity; and should both these compounds appear in more than one system, then the third component becomes the decisive factor.

The solubilities listed are calculated for the molecular formulae of the compounds appearing in each Table. The solubilities are expressed in Wt%; Vol%; Mol%; or g/l; the last unless otherwise stated refers to the solubility in grams per litre of solvent. Temp "t" is in degrees Centigrade and Pressure "p" in mm of Mercury.

Formula Index (pp. 1796–1865 for Ternary systems and pp. 1866–1871 for Multicomponent systems).

The formulae of Components "A", the substances dissolved are arranged in accordance with the systemization outlined above. The components "B", "C" and in the case of Multicomponent systems "D" refer to the solvents in each case and are arranged in line with component "A".

Systematic Index of Compounds (pp. 1872 onwards for Ternary Systems, followed by Multicomponent Systems). The names of the component "A" arranged alphabetically conform to the I.U.P.A.C rules. Inorganic and Metallo-organic compounds are listed under the Elements in alphabetical order except that Acids, Hydrazine, Hydroxylamine and Thionyl, Sulfonium and Uranyl compounds

have separate headings. Ferrous and Ferric compounds are under *Iron*; *stannous and stannic under Tin*; *cuprous and cupric under* Copper; aurous and auric under Gold. Prefixes like di-, tri-, meta-, pyro-, etc., as well as chloro-, bromo-, nitro-, etc., are alphabetized. Binary compounds of Hydrogen (except NH_3 and H_2O) are listed under Hydrogen, e.g. Hydrogen Chloride, Hydrogen Fluoride, etc. Metallic complexes, e.g. ammino and related compounds as well as chloroplatinates, hexacyanoferrates, etc., are listed under the element in question and alphabetically arranged together with the simpler salts.

The Organic compounds are arranged within the same alphabet by PARENT COMPOUND, the substituting atoms and groups, e.g. chloro-, bromo-, methyl-, nitro-, etc., being arranged alphabetically under this name.

The components "B", "C" and in the case of Multicomponent systems "D" are arranged alongside component "A" in alphabetical order. In Tables giving the Mutual Solubility of the components or the Equilibrium concentration of two substances in a solvent, then the components are placed in the groups "A", "B" and "C" and in some cases "D" in turn according to the alphabetical order of their names.

General Index. This index lists the formulae of every substance mentioned in the Tables with the exception of H_2O, irrespective of the function of that substance in the Tables or the position of that substance in the first two Indexes. The arrangement of the formulae in the General Index is in accordance with the complexity of their molecules and in principle follows the arrangement of the material in the book.

№ 2796 [768]

FORMALDEHYDE – WATER – 2-ETHYLBUTANOL

$CH_2O—H_2O—C_6H_{14}O$

$= 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Alcohol layer	Water layer	Alcohol layer
9.85	17.20	1.0280	0.8947
0.593	2.167	0.8452	0.593

№ 2799 [768]

FORMALDEHYDE – WATER – 2-ISOPROPROXYPROPANE

$CH_2O—H_2O—C_6H_{14}O$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Ether layer	Water layer	Ether layer
24.18	0.305	1.0717	0.7287
2.387	0.181	1.0056	0.7260

№ 2800 [768]

FORMALDEHYDE – WATER – p-CRESOL

$CH_2O—H_2O—C_7H_8O$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	p-Cresol layer	Water layer	p-Cresol layer
18.90	9.39	1.0559	1.0480
2.290	0.477	1.0058	1.0268

№ 2801 [768]

FORMALDEHYDE – WATER – BENZYL ALCOHOL

$CH_2O—H_2O—C_7H_8O$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Alcohol layer	Water layer	Alcohol layer
8.86	15.06	1.0266	1.0713
0.562	1.810	1.0028	1.0436

№ 2802 [768]

FORMALDEHYDE – WATER – 2-HEPTANONE

$CH_2O—H_2O—C_7H_{14}O$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Ketonic layer	Water layer	Ketonic layer
24.23	1.08	1.0719	0.8150
2.420	0.0891	1.0049	0.8126

№ 2803 [768]

FORMALDEHYDE – WATER – BUTYL LACTATE

$CH_2O—H_2O—C_7H_{14}O_3$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Ester layer	Water layer	Ester layer
17.00	11.22	1.0536	1.0184
1.377	1.211	1.0059	0.9894

№ 2804 [768]

FORMALDEHYDE – WATER – N-DIMETHYLANILINE

$CH_2O—H_2O—C_8H_{11}N$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	N-Dimethyl-aniline layer	Water layer	N-Dimethyl-aniline layer
24.61	0.181	1.0733	0.9550
2.481	0.0576	1.0070	0.9546

№ 2805 [768]

FORMALDEHYDE – WATER – 1-OCTANOL

$CH_2O—H_2O—C_8H_{18}O$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Alcohol layer	Water layer	Alcohol layer
12.51	16.07	1.0382	0.8743
0.765	2.069	1.0020	0.8363

№ 2806 [768]

FORMALDEHYDE – WATER – N-ETHYL-N-β-HYDROXYETHYLANILINE

$CH_2O—H_2O—C_{10}H_{15}NO$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Organic layer	Water layer	Organic layer
13.02	12.79	1.0387	1.0670
0.900	1.533	1.0012	1.0420

№ 2807 [768]

FORMALDEHYDE – WATER – ETHYLENE GLYCOL DIBUTYL ETHER

$CH_2O—H_2O—C_{10}H_{22}O_2$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Organic layer	Water layer	Organic layer
24.20	0.680	1.0720	0.8379
2.358	0.119	1.0059	0.8350

№ 2808 [768]

FORMALDEHYDE – WATER – 9-OCTADECENOIC ACID

$CH_2O—H_2O—C_{18}H_{34}O_2$

$t = 25$

Equilibrium concn. Formaldehyde, wt %		d_4^{25}	
Water layer	Acid layer	Water layer	Acid layer
25.20	0.318	1.0746	0.8990
2.520	0.0182	1.0065	0.8980

№ 2809 **WATER – UREA – FORMIC ACID** [107]

$H_2O—CH_4N_2O—CH_2O_2$

Comp. of saturated soln., mol %			t_{pt}	Comp. of saturated soln., mol %			t_{pt}
Water	Urea	Formic Acid		Water	Urea	Formic Acid	
88.0	0.0	12.0	— 10.3	56.0	30.0	14.0	16.0
83.6	5.0	11.4	— 11.3	48.0	40.0	12.0	39.7
79.2	10.0	10.8	— 13.3	40.0	50.0	10.0	59.8
74.8	15.0	10.2	— 16.3	32.0	60.0	8.0	80.2
73.9	16.0	10.1	— 17.0	24.0	70.0	6.0	99.3
73.0	17.0	10.0	— 15.5	16.0	80.0	4.0	113.2
71.3	19.0	9.7	— 18.3	72.0	0.0	28.0	— 29.3
67.8	23.0	9.2	5.4	68.4	5.0	26.6	— 27.4
61.6	30.0	8.4	22.4	66.2	8.0	25.8	— 26.0
52.8	40.0	7.2	43.0	63.4	12.0	24.6	— 25.6
44.0	50.0	6.0	63.5	61.2	15.0	23.8	— 26.1
35.2	60.0	4.8	83.4	59.8	17.0	23.2	— 27.2
26.4	70.0	3.6	99.6	58.3	19.0	22.7	— 27.9
17.6	80.0	2.4	113.0	56.9	21.0	22.1	— 28.7
0.0	100.0	0.0	132.7	55.4	23.0	21.6	— 15.8
80.0	0.0	20.0	— 19.7	53.3	26.0	20.7	— 4.8
78.4	2.0	19.6	— 19.0	50.4	30.0	19.6	10.3
76.8	4.0	19.2	— 18.2	43.2	40.0	16.8	34.5
75.2	6.0	18.8	— 18.2	36.0	50.0	14.0	57.3
73.6	8.0	18.4	— 18.2	28.8	60.0	11.2	79.5
72.0	10.0	18.0	— 18.6	21.6	70.0	8.4	90.3
70.4	12.0	17.6	— 19.6	14.4	80.0	5.6	112.0
68.8	14.0	17.2	— 20.1	63.0	0.0	37.0	— 43.0
67.2	16.0	16.8	— 21.5	60.5	4.0	35.5	— 38.5
65.6	18.0	16.4	— 22.3	59.2	6.0	34.8	— 36.5
64.8	19.0	16.2	— 22.7	55.4	12.0	32.6	— 33.7
64.0	20.0	16.0	— 15.5	52.9	16.0	31.1	— 33.0
60.8	24.0	15.2	— 0.5	50.4	20.0	29.6	— 32.5

Table № 2809 (continuation)

Comp. of saturated soln., mol %			t_{pt}	Comp. of saturated soln., mol%			t_{pt}
Water	Urea	Formic Acid		Water	Urea	Formic Acid	
49.1	22.0	28.9	— 32.2	20.0	60.0	20.0	73.5
47.9	24.0	28.1	— 26.7	15.0	70.0	15.0	94.2
46.6	26.0	27.4	— 16.5	10.0	80.0	10.0	111.8
40.9	35.0	24.1	19.5	20.0	0.0	80.0	— 5.5
37.8	40.0	22.2	32.6	19.0	5.0	76.0	— 6.8
31.5	50.0	18.5	55.0	18.0	10.0	72.0	— 14.2
25.2	60.0	14.8	75.4	17.2	14.0	68.8	— 21.6
18.9	70.0	11.1	95.2	16.4	18.0	65.6	— 18.2
12.6	80.0	7.4	111.5	15.4	23.0	61.6	— 14.9
6.3	90.0	3.7	124.7	15.0	25.0	60.0	— 14.0
58.0	0.0	42.0	— 46.7	14.4	28.0	57.6	— 14.0
54.7	5.7	39.6	— 49.8	13.8	31.0	55.2	— 16.0
53.4	8.0	38.6	— 41.7	13.4	33.0	53.6	— 10.1
52.2	10.0	37.8	— 38.9	13.0	35.0	52.0	— 8.0
51.0	12.0	37.0	— 37.2	12.0	40.0	48.0	— 3.7
49.3	15.0	35.7	— 35.6	11.0	45.0	44.0	23.5
48.1	17.0	34.9	— 33.5	8.0	60.0	32.0	66.0
47.6	18.0	34.4	— 35.2	6.0	70.0	24.0	88.0
47.0	19.0	34.0	— 30.0	4.0	80.0	16.0	108.2
45.2	22.0	32.8	— 25.5	0.0	5.0	95.0	— 3.0
44.1	24.0	31.9	— 23.2	15.0	4.2	80.8	— 5.0
43.5	25.0	31.5	— 21.5	20.0	4.0	76.0	— 7.6
43.0	26.0	31.0	— 21.0	30.5	3.5	66.0	— 15.3
41.8	28.0	30.2	— 15.1	40.0	3.0	57.0	— 25.5
40.6	30.0	29.4	— 10.0	50.0	2.5	47.5	— 38.0
36.0	38.0	26.0	19.2	53.4	2.3	44.3	— 42.0
26.1	55.0	18.9	63.3	56.4	2.2	41.4	— 47.5
20.3	65.0	14.7	84.8	58.0	2.1	39.9	— 47.0
14.5	75.0	10.5	102.5	60.0	2.0	38.0	— 42.8
8.7	85.0	6.3	119.0	72.0	1.9	26.1	— 27.7
50.0	0.0	50.0	— 35.3	90.0	0.5	9.5	— 8.7
46.5	7.0	46.5	— 42.7	0.0	12.0	88.0	— 5.4
45.0	10.0	45.0	— 35.8	17.9	9.8	72.3	— 13.5
43.55	12.9	43.55	— 31.5	30.2	8.4	61.4	— 23.5
42.5	15.0	42.5	— 31.2	46.1	6.5	47.4	— 41.0
41.5	17.0	41.5	— 29.5	50.8	5.9	43.3	— 45.0
41.0	18.0	41.0	— 29.0	54.0	5.6	40.4	— 48.2
40.4	19.2	40.4	— 29.2	55.8	5.3	38.9	— 49.8
39.5	21.0	39.5	— 30.6	58.0	5.0	47.0	— 42.0
39.0	22.0	39.0	— 24.1	60.1	4.8	35.1	— 38.2
37.9	24.2	37.9	— 20.5	70.0	3.6	26.4	— 27.5
37.05	25.9	37.05	— 19.5	80.0	2.4	17.6	— 17.4
36.0	28.0	36.0	— 16.8	90.0	1.2	8.8	— 9.0
35.0	30.0	35.0	— 15.6	0.0	25.0	75.0	— 13.4
34.0	32.0	34.0	— 2.8	15.0	21.2	63.8	— 16.0
30.0	40.0	30.0	26.0	20.5	19.9	59.6	— 18.4
25.0	50.0	25.0	50.7	26.0	18.5	55.5	— 20.8

Table № 2809 (continuation)

Comp. of saturated soln., mol %			t_{pt}	Comp. of saturated soln., mol %			t_{pt}
Water	Urea	Formic Acid		Water	Urea	Formic Acid	
30.0	17.5	52.5	— 22.5	0.0	35.0	65.0	— 15.5
35.7	16.1	48.2	— 25.6	10.0	31.5	58.5	— 16.2
45.0	13.7	41.3	— 32.2	22.7	27.0	50.3	— 18.2
54.0	11.5	34.5	— 39.5	27.0	25.5	47.5	— 21.0
55.0	11.2	33.8	— 36.5	35.0	22.7	42.3	— 24.5
64.5	8.9	26.6	— 27.7	42.0	20.3	37.7	— 31.7
70.0	7.5	22.5	— 23.3	44.0	19.6	36.4	— 34.0
80.0	5.0	15.0	— 14.9	48.6	18.0	33.4	— 39.2
0.0	33.3	66.7	— 11.5	50.0	17.5	32.5	— 37.5
14.6	28.4	57.0	— 13.9	58.0	14.7	27.3	— 30.5
20.8	26.4	52.8	— 17.0	65.0	12.2	22.8	— 24.8
25.3	24.9	49.8	— 19.8	80.0	7.0	13.0	— 13.8
30.4	23.2	46.4	— 22.5	0.0	37.0	63.0	— 12.5
36.4	21.2	42.4	— 26.7	22.1	28.8	49.1	— 17.7
39.0	20.3	40.7	— 28.0	30.0	25.9	44.1	— 20.0
46.0	18.0	36.0	— 33.5	43.0	21.1	35.9	— 27.5
48.2	17.3	34.5	— 34.5	45.0	20.3	34.7	— 29.5
50.3	16.6	33.1	— 37.0	49.0	18.9	32.1	— 32.3
53.1	15.6	31.3	— 34.0	50.2	18.4	31.4	— 32.7
58.1	14.0	27.9	— 30.5	52.0	17.8	30.2	— 32.5
60.0	13.3	26.7	— 29.0	55.0	16.6	28.4	— 30.8
70.0	10.0	20.0	— 21.7	60.0	14.8	25.2	— 27.0
75.0	8.3	16.7	— 17.5	70.0	11.1	18.9	— 19.7
85.0	5.0	10.0	— 11.4	80.0	7.4	12.6	— 13.0

№ 2810 OXALIC ACID – FORMIC ACID – WATER [815]

$C_2H_2O_4$—CH_2O_2—H_2O

$t = 25$

Equilibrium concn., g/l			
Oxalic Acid	Formic Acid	Oxalic Acid	Formic Acid
107.2	4.36	95.90	365.8
107.3	19.66	84.06	495.0
108.5	43.52	79.11	547.6
108.6	57.92	67.32	748.4
109.8	82.12	70.56	868.2
109.4	120.5	105.3	950.0
104.7	241.2		

CH_2O_2—$C_2H_4Cl_2$—H_2O

Comp. of equilibrium phases, wt %						t
Water layer			1,2-Dichloroethane layer			
Formic Acid	1,2-Dichloroethane	Water	Formic Acid	1,2-Dichloroethane	Water	
15.93	1.80	82.27	0.177	99.813	0.010	30
24.33	2.00	73.67	0.276	99.674	0.050	30
26.34	2.00	71.66	0.326	99.644	0.030	30
35.10	3.00	61.90	0.517	99.433	0.050	30
43.50	3.50	53.00	0.841	99.069	0.090	30
50.49	4.00	45.51	0.897	99.003	0.100	30
53.83	5.50	40.67	1.479	98.371	0.150	30
59.56	8.20	32.24	2.230	97.550	0.220	30
65.14	15.80	19.06	6.225	93.175	0.600	30
52.41	35.20	12.39	20.92	77.08	2.00	30
36.5	59.0	4.5	Critical point			30
16.45	2.00	81.55	0.229	99.741	0.030	45
26.56	3.00	70.44	0.429	99.511	0.060	45
27.76	3.20	69.04	0.487	99.433	0.080	45
38.98	4.00	57.02	0.828	99.022	0.150	45
44.17	4.70	51.13	1.100	98.730	0.170	45
49.07	5.50	45.43	1.467	98.283	0.250	45
53.96	7.30	38.74	2.038	97.622	0.340	45
59.79	11.20	29.01	3.091	96.399	0.510	45
61.42	14.00	24.58	3.814	95.536	0.650	45
57.22	29.50	13.28	10.74	87.26	2.00	45
51.52	39.00	9.48	19.93	77.07	3.00	45
36.4	58.1	5.5	Critical point			45
14.86	1.80	83.34	0.270	99.670	0.060	60
21.05	2.10	76.85	0.415	99.505	0.080	60
27.63	3.00	69.37	0.675	99.245	0.080	60
38.60	4.50	56.90	1.154	98.676	0.170	60
44.01	6.00	49.99	1.493	98.257	0.250	60
50.24	7.80	41.96	2.086	97.574	0.340	60
52.28	8.90	38.82	2.510	97.070	0.420	60
58.42	14.00	27.58	3.942	95.378	0.680	60
59.21	16.00	24.79	5.356	93.734	0.910	60
59.60	18.80	21.60	9.080	88.720	2.200	60
36.0	57.0	7.0	Critical point			60

№ 2812 [815]

SUCCINIC ACID – FORMIC ACID – WATER

$C_4H_6O_4$—CH_2O_2—H_2O

$t = 25$

Equilibrium concn., g/l			
Succinic Acid	Formic Acid	Succinic Acid	Formic Acid
80.84	4.14	72.51	519.3
82.49	20.52	55.74	703.3
83.14	42.78	47.00	812.8
88.63	171.6	42.22	881.4
90.41	255.2	39.39	944.4
85.56	345.0	35.67	1055

№ 2813 [235]

FORMIC ACID – 2-BUTANONE – WATER

CH_2O_2—C_4H_8O—H_2O

$t = 25$

Equilibrium concn. Formic Acid, g/l	
Water layer	Ketonic layer
5.647	7.600
15.77	20.41

№ 2814 [235]

FORMIC ACID – 1-BUTANOL – WATER

CH_2O_2—$C_4H_{10}O$—H_2O

$t = 25$

Equilibrium concn. Formic Acid, g/l	
Water layer	Alcohol layer
11.794	10.360
36.130	29.254

№ 2815 [235]

FORMIC ACID – 2-BUTANOL – WATER

CH_2O_2—$C_4H_{10}O$—H_2O

$t = 25$

Equilibrium concn. Formic Acid, g/l	
Water layer	Alcohol layer
5.445	5.883
15.94	17.01

№ 2816 FORMIC ACID – ETHYL ETHER – WATER [1096, 1097]

$CH_2O_2—C_4H_{10}O—H_2O$

Equilibrium concn. Formic Acid, g/l		t	Equilibrium concn. Formic Acid, g/l		t
Water layer	Ether layer		Water layer	Ether layer	
1.154	0.526	15	0.0523	0.0210	15
0.619	0.274	15	1.245	0.488	26.3
0.322	0.134	15	0.663	0.245	26.3
0.146	0.0584	15	0.394	0.142	26.3
0.0976	0.0386	15	0.158	0.0561	26.3

№ 2817 [1284, 1285]

FORMIC ACID – ETHYL ETHER – WATER

$CH_2O_2—C_4H_{10}O—H_2O$

$t = 25$

Equilibrium concn. Formic Acid, g/l	
Water layer	Ether layer
1.380	0.610
0.619	0.218
0.417	0.150
0.301	0.106
0.219	0.075

№ 2818 [1199]

FORMIC ACID – ETHYL ETHER – WATER

$CH_2O_2—C_4H_{10}O—H_2O$

$t = 20$

Equilibrium concn. Formic Acid, g/l	
Water layer	Ether layer
27.55	10.86
52.99	22.40
104.0	48.81
188.0	110.0
270.0	192.8
296.0	236.0

№ 2819 FORMIC ACID – ETHYL ETHER – WATER [1238]

$CH_2O_2—C_4H_{10}O—H_2O$

$t = 1$

Equilibrium concn. Formic Acid, g/l			
Water layer	Ether layer	Water layer	Ether layer
2.185	0.809	16.99	6.790
2.295	0.851	23.42	9.535
4.41	1.673	31.20	12.86
4.76	1.812	38.44	16.07
8.99	3.473	48.60	20.82
13.20	5.210	62.00	27.86

№ 2820 [235]

FORMIC ACID — 1-PENTANOL — WATER

CH_2O_2—$C_5H_{12}O$—H_2O

$t = 25$

Equilibrium concn. Formic Acid, g/l	
Water layer	Alcohol layer
6.622	3.829
22.550	11.725

№ 2821 [235]

FORMIC ACID — 2-METHYL-2-BUTANOL — WATER

CH_2O_2—$C_5H_{12}O$—H_2O

$t = 25$

Equilibrium concn. Formic Acid, g/l	
Water layer	Alcohol layer
5.267	5.991
16.60	18.28

№ 2822 [75]

FORMIC ACID — WATER — NITROBENZENE

CH_2O_2—H_2O—$C_6H_5NO_2$

$t = 25$

Equilibrium concn. Formic Acid, g/l			
Water layer	Nitrobenzene layer	Water layer	Nitrobenzene layer
8.515	0.175	445.70	14.564
22.509	0.472	563.71	22.748
42.417	0.888	656.53	35.669
56.617	1.197	763.83	100.34
86.444	1.887	759.77	146.50
116.09	2.527	751.65	160.07
143.83	3.190	686.68	229.46
213.51	5.100	626.38	292.48
275.77	7.084		

№ 2823 A[598]

FORMIC ACID — BENZENE — WATER

CH_2O_2—C_6H_6—H_2O

$t = 13$—15

Equilibrium concn. Formic Acid, g/l			
Water layer	Benzene layer	Water layer	Benzene layer
40.64	0.107	94.60	0.233
61.56	0.140	163.04	0.413
72.00	0.160	204.96	0.760
84.48	0.207	313.44	0.920

№ 2824 **FORMIC ACID – BENZENE – WATER** [529]

$CH_2O_2—C_6H_6—H_2O$

Comp. of solvent, wt %		Solubility of Benzene, wt %	t	Comp. of solvent, wt %		Solubility of Benzene, wt %	t
Formic Acid	Water			Formic Acid	Water		
95	5	96.3	57.5	85	15	14.3	100.5
95	5	94.4	77	85	15	10	81
95	5	89.8	95	85	15	7	46
95	5	85.2	112	75	25	12	122
95	5	24.7	94.5	75	25	8.5	97.5
95	5	20	80.5	75	25	6	74
95	5	12.5	51	60	40	6	105
85	15	97.5	71	60	40	3.8	82
85	15	96.6	87	60	40	3	76
85	15	96	101				

№ 2825 [619]

FORMIC ACID – BENZENE – WATER

$CH_2O_2—C_6H_6—H_2O$

$t = 25$

Equilibrium concn. Formic Acid, wt %	
Water layer	Benzene layer
5.3	0.0170
6.4	0.0197
9.9	0.0400
13.6	0.0584
18.5	0.0840
29.2	0.156
41.2	0.332
58.2	0.800

№ 2826 [332]

FORMIC ACID – BENZENE – WATER

$CH_2O_2—C_6H_6—H_2O$

$t = 25$

Equilibrium concn. Formic Acid, g/l	
Water layer	Benzene layer
156.3	0.539
172.7	0.635
181.0	0.676
216.0	0.865
252.0	1.071
312.8	1.800

№ 2827 **FORMIC ACID – WATER – BENZENE** [8]

$CH_2O_2—H_2O—C_6H_6$

Equilibrium concn. Formic Acid, g/l		t	Equilibrium concn. Formic Acid, g/l		t
Water layer	Benzene layer		Water layer	Benzene layer	
67.080	0.104	0	461.72	1.740	0
126.32	0.209	0	582.81	2.757	0
153.33	0.297	0	623.75	3.627	0
367.63	1.105	0	784.04	7.406	0