

TABLE XII. ORGANIC DERIVATIVES OF CARBOXYLIC ACIDS

a) Liquids 1) (Listed in order of increasing atmospheric b.p.)*

No	Name	Boiling point, °C	Melting point, °C	n_D^{20}	D_4^{20}	<i>p</i> -Toluidide	Anilide	<i>p</i> -Bromophenacyl ester	Amide	Methyl ester	Ethyl ester	Miscellaneous
1	Thioacetic acid	93			1 074 ₁ ¹⁰	130	76		108			
2	Formic acid	100.7	8.4	1.37137	1.22026	53	50	140-135				<i>p</i> -Nitrobenzyl ester, 31
3	Acetic acid (Ethanoic acid)	118.2	16.6	1.36976 1.3721	1.04926	153 147	114	86.0	82			<i>p</i> -Nitrobenzyl ester, 78
4	Difluoroacetic acid	134.5							52			
5	Acrylic acid	141, 140	13	1.4224	1.0621 ₁ ¹⁵	141	104.5, w		84-5, pet eth			
6	Propionic acid (Propanoic acid)	141	-20.8	1.3868	0.99336	126, 123	106	63.4	81			<i>p</i> -Nitrobenzyl ester 31
7	Propiolic acid	144d	18		1.139 ₁ ¹⁵		87		61.2			
8	Isobutyric acid (Isobutanoic acid)	154.7	-46.1	1.3920	0.94791	108.5 9.5	105	76.8	128 129			
9	Methacrylic acid	161	16	1.429	1.015				102.6			<i>p</i> -Bromoanilide, 116
10	<i>n</i> -Butyric acid (<i>n</i> -Butanoic acid)	162.5 164	-5.5 -8	1.3983 1.3979	0.95790	75	96.97	63	115.6			<i>p</i> -Nitrobenzyl ester, 35
11	Pyruvic acid (α -Oxopropionic acid)	165d 80 ²⁷	13.6	1.4138	1.2668 ₁ ¹⁷	109 130	104, subl		124.5, 145			2,4-Dinitrophenylhydrazone 218, yellow
12	Vinylacetic acid (3-Butenoic acid)	169-163	-35	1.4221	1.0094		58		73			
13	Isocrotonic acid (<i>cis</i> - β -Crotonic acid <i>cis</i> -2-Butenoic acid)	169	15	1.4456	1.0265	132	101.2	81	101.2			
14	<i>d</i> -2-Methylbutanoic acid (Ethylmethylacetic acid)	176.7 174		1.4052	0.938 ₂₀ ²⁰	92.5 3.0	110	55	112			
15	Isovaleric acid (3-Methylbutanoic acid)	176.5	-30.0	1.4043	0.92623	106.7	109.5 (cor)	68.0	135 137			
16	<i>n</i> -Amylpropionic acid (1-Heptyne-1-carboxylic acid)	180 220d	f p 2.5			68, bz			91			Nitrile, b p 194 6 <i>o</i> -Toluidide, 60, pet eth
17	3,3-Dimethylbutanoic acid (<i>tert</i> -Butylacetic acid)	184, 96 ²⁶	6.7	1.4096	0.9124	134	132, et ac-pet eth		132	b p 126		
18	<i>d</i> -1- α -Chloropropionic acid	186				124			80			
19	Cyclopropanecarboxylic acid	186, 182.4	17, 18-9	1.43901	1.0885				125		b p 134, n_D^{20} 1.41902, D_4^{25} 0.96078	
20	<i>n</i> -Pentanoic acid (<i>n</i> -Valeric acid)	186.4	-34.5	1.4086	0.93922	74	63	75	106			
21	2,2-Dimethylbutanoic acid (Dimethylethylacetic acid)	187, 190	-15.0	1.4141, 1.4145	0.9276	83.0	59.2, 90-1		103			<i>p</i> -Phenylphenacyl ester, 86
22	Allylacetic acid (4-Pentenoic acid)	188.9		1.4341 1.4283	0.9843 ₁ ¹⁸				94, b p 230	b p 144.6		
23	Cyclopropylacetic acid	190 ⁷⁵⁰		1.4320 ²⁵								<i>p</i> -Phenylphenacyl ester, 83
24	<i>d</i> -1-2,3-Dimethylbutanoic acid (Isopropylmethylacetic acid)	191.7	-1.5	1.4146	0.9275	112.6	78.4		132			<i>p</i> -Phenylphenacyl ester, 74
25	Dichloroacetic acid	194	5-6	1.4659	1.5634	153	118	99	98, subl			

* Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XII. ORGANIC DERIVATIVES OF CARBOXYLIC ACIDS

a) Liquids 1) (Listed in order of increasing atmospheric b.p.)* (Continued)

No	Name	Boiling point, °C	Melting point, °C	n_D^{20}	D_4^{20}	<i>p</i> -Toluidide	Anilide	<i>p</i> -Bromophenacyl ester	Amide	Methyl ester	Ethyl ester	Miscellaneous
26	Cyclobutanecarboxylic acid	195	1 4403 ²⁵	1 0599					152 3	b p 136 0 - 5	b p 159 62	
27	2-Ethylbutanoic acid (Diethylacetic acid)	195	- 31 8	1 4132	0 9239	116 2	127 5		112 107			
28	<i>d</i> 1-2-Methylpentanoic acid (Methyl- <i>n</i> -propylacetic acid)	195 6		1 4136	0 9230	81	95		79 6			
29	<i>d</i> , <i>l</i> -3-Methylpentanoic acid	197 5	- 41 6	1 4159	0 9262	74 8	87, 88		124 9			
30	4-Methylpentanoic acid (Iso caproic acid, Isobutylacetic acid)	199 1 ⁷⁵²	- 33	1 4144	0 9225	63 0	112 0, 110 5 111 5	77 3	120 1			
31	Methoxyacetic acid (Glycolic acid methyl ether)	204, 203		1 41677	1 1768		58, pet eth		96 5 7 0, 92-4 78			
32	2-Ethyl-2-methylbutanoic acid (Diethylmethylacetic acid)	204		1 4256								
33	Hexanoic acid (<i>n</i> -Caproic acid)	205 35	- 3 9, f p - 1 5- - 2	1 41635	0 93568	74 5	94 5	72 0	100, 101		b p 166-7	
34	Ethoxyacetic acid (Glycolic acid ethyl ether)	206 7		1 41937	1 1021	32, eth	95 92	104 8	80-2			
35	5-Methylhexanoic acid	207 ⁷⁵²		1 4220			75		103			
36	2-Ethylpentanoic acid (Ethyl- <i>n</i> -propylacetic acid)	209				129	94		104 5			
37	2-Methylhexanoic acid (<i>n</i> - Butylmethylacetic acid)	209 6		1 4189 ²⁵		85	98		73 70- 2 5			
38	α -Chloroisovaleric acid	20-2									b p 178 9	Nitrile b p 154 5 Chloride, b p 149
39	α -Bromobutanoic acid	217d				92	98		112, 108			
40	4-Methylhexanoic acid	217 8 ⁷⁵⁴		1 4211	0 9194		76 5		98			
41	2,2-Dimethylhexanoic acid	218							89			
42	4-Ethyl-4-methylbutanoic acid (<i>active</i> -Amylacetic acid)	221			0 9149					b p 158 64	b p 173 9	$[\alpha]_D^{25}$ +7 6 in me al
43	2-Chloro- <i>n</i> -valeric acid (2- Chloropentanoic acid)	222								b p 160	b p 185-6	Nitrile, b p 160
44	<i>n</i> -Heptanoic acid (<i>n</i> -Heptoic acid)	223 0	- 7 46	1 4234	0 91808	81	70, 65	72 0	96, 96 5			
45	2-Ethylhexanoic acid (α -Ethylcaproic acid)	228							102			<i>p</i> -Phenylphenacyl ester, 53 4, 49 5 50
46	Cyclohexylacetic acid	237							172			
47	<i>n</i> -Caprylic acid (<i>n</i> -Octanoic acid)	237, 239 3	16 3	1 4268	0 90884	70	57	67 4	110, 106		b p 207 8 ⁷⁵⁴	
48	Pelargonic acid (<i>n</i> -Nonanoic acid)	254 4	12 3	1 43446 ¹⁵ yel	0 90552	84	57	68 5	99			
49	<i>d</i> -Citronellic acid (2,6-Di- methyl-1-octene-8-carboxylic acid)	257			0 9308				84 5		b p 113 5 ¹² , $[\alpha]_D^{25}$ +0 3	$[\alpha]_D$ +21, Nitrile, b p 230, D^{20} 0 8645
50	2-Phenylpropionic acid	265							92			
51	4-Acetylbutanoic acid (γ - Acetobutyric acid)	275d, 195- 200 ⁸⁵	13-4			123, w			114, chl			Semicarba- zone 175d (+1 H ₂ O), w, Oxime, 104 5 bz

*Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XII. ORGANIC DERIVATIVES OF CARBOXYLIC ACIDS

a) Liquids 2) (Reduced pressure b.p. only) (Listed in order of increasing amide m.p.)*

No	Name	Amide	Boiling point, °C	Melting point, °C	n_D^{20}	D_4^{20}	<i>p</i> -Toluidide	Anilide	<i>p</i> -Bromophenacyl ester	Methyl ester	Ethyl ester	Miscellaneous
1	3-Ethoxypropionic acid	51	120 ¹⁷		1.4216							
2	3-Heptynoic acid	67	102 ²	14	1.4635 ²⁵							
3	2-Heptynoic acid	68 9, al	135 ²⁰		1.4619	0.978				b p 91-3 ¹⁹ , n_D^{20} 1.4455, D_4^{20} 0.937		
4	<i>trans</i> -Oleic acid	75-6	216 ⁵ , 250 (superheated steam)	α 13.36, β 16.25	1.4597		42.5	41	40, 46			
5	2-Fluoropropionic acid	76	60 ⁸									
6	2-Azidoisovaleric acid (2-Triazoisovaleric acid)	78 9, bz	82 ^{0 1}			1.0638 ³³					b p 82 ¹⁶ , D_{20}^{20} 1.0295	
7	<i>d,l</i> -Lactic acid	78 5 9 0 (cor), bz -al (3 1)	122 ¹⁵	18			107	58 5-9 0, w	112 8	144 8	154	
8	<i>d,l</i> -2-Azidopropionic acid (<i>d,l</i> -2-Triazopropionic acid)	80, bz	121 5 ²⁰								b p 70 ¹⁶ , n_D^{25} 1.428 57, D_{23}^{23} 1.065	Explodes on heating
9	2-Ethyl-3-Hexenoic acid	80	132 ¹⁹									
10	4-Phenoxybutanoic acid	80	197 ¹⁸									
11	2-Methoxypropionic acid	81	89 ¹⁰									
12	<i>l</i> -Citronelic acid (2,6-Dimethyl-1-octen-8-carboxylic acid)	84-5	117 9 ^{0 6}		1.4563 ²⁴	0.9274 ²⁵	93-4	76		b p 86 ^{1 1}		$[\alpha]_D^{25}$ -6.6
13	2-Ethyl-4-methylpentanoic acid (Ethylisobutylacetic acid)	89	115 ²⁰									
14	2-Octynoic acid	90	133 ¹⁰		1.4595			60				
15	6-Methyloctanoic acid	91	149 ²³		1.4337							
17	3-Methylhexanoic acid	98	112 ¹⁶		1.4222							
18	2,3-Dimethylpentanoic acid	102	92 ¹⁵									
19	2-Cyanopropionic acid	105, 81	142-5 ¹¹								b p 192-3	
20	7-Methyloctanoic acid	106	105 ²									
21	1-Chlorocyclohexane carboxylic acid	110, me al -w	138-40 ¹³									Ethylamide, 53
22	2-Cyanobutanoic acid	113	153-5 ¹⁵								b p 207-9	
23	Methylnepentylacetic acid	123	108 ¹⁴									
24	2-Isopropylbutanoic acid (2-Ethyl-3-methylbutanoic acid)	135	105 ¹⁵									
25	5-Cyclopentylpentanoic acid	136	123 ^{4 5}									
26	2-Methylcyclopentane-carboxylic acid	148	107 ⁹		1.4504 ²²							
27	3,4,4-Trimethylpentanoic acid	167	98 ⁴		1.4320 ²¹							
28	<i>cis</i> -4-Methylcyclohexane-carboxylic acid	175	130 ¹³									
29	Cyclopentanecarboxylic acid	179	123 ²⁷									

*Derivative data given in order m p, crystal color, solvent from which crystallized