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THE POLYTECHNIC INSTITUTE OF BROOKLYN

ORGANIC PEROXIDES
A TABLE OF PHYSICAL CONSTANTS

- - - by - - -

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ORGANIC PEROXIDES: A Table of
Physical Constants

- - - by - - -

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During the past seventy years a wide variety of organic peroxides have been prepared. In the succeeding table, the physical constants of a selected number of peroxides are presented with reference to the original literature or to review articles which list the original references. For more general reference to the chemistry of organic peroxides, consult the articles of Rieche^{1,2}, Hawkins³, Criegee⁴ and others⁵⁻⁸.

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 2. A. Rieche, Die Bedeutung der Organischen Peroxyde für die Chemische Wissenschaft u. Technik, Sammlung 34, 1936.
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C O N T E N T S

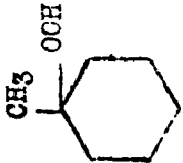
	<u>PAGE</u>
1. Peroxides of Structure ROOH (Hydroperoxides) - - - - -	1
A. Saturated Aliphatic Hydroperoxides - - - - -	1
B. Olefin Hydroperoxides- - - - -	4
C. Aralkyl Hydroperoxides - - - - -	6
D. Hydroperoxides of Heterocyclic Compounds - - - -	8
2. Peroxides of Structure ROOR (Dialkyl Peroxides)- - - -	9
A. Dialkyl Peroxides- - - - -	9
B. Hexaarylethane Peroxides - - - - -	11
C. Transannular Peroxides - - - - -	11
3. Peroxides of Structure $\text{RC}(=\text{O})\text{OOH}$ (Peracids)- - - - -	13
A. Aliphatic Peracids- - - - -	13
B. Aromatic Peracids - - - - -	13
4. Peroxides of Structure $\text{RC}(=\text{O})\text{OOR}$ (Peresters) - - - - -	14
5. Peroxides of Structure $\text{RC}(=\text{O})\text{OO}-\text{C}(=\text{O})\text{R}$ (Diacyl and Diaroyl Peroxides)- - - - -	15
A. Diacyl Peroxides - - - - -	15
B. Diaroyl Peroxides- - - - -	16
C. Dialkyl Peroxydicarbonates - - - - -	16
6. Peroxy Derivatives of Aldehydes and Ketones- - - - -	17
A. Hydroxyalkyl Hydroperoxides- - - - -	17
B. Bishydroxyalkyl Peroxides- - - - -	17
C. Polyalkylidene Peroxides - - - - -	18
D. Monohydroxydialkyl Peroxides - - - - -	19
E. Per-Acetals- - - - -	20
7. Literature Reference - - - - -	21

1. PEROXIDES OF STRUCTURED RING (HYDROPEROXIDES)

Name	Formula	Refrectivity n_D^{20}	Melting Point °C.	Boiling Point °C/mm.Hg.	Literature Reference**
A. Saturated Aliphatic Hydroperoxides					
Methyl Hydroperoxide	CH_3OOH	1.3608	-72 to -78	$\log p = 8.38-1972/T.^\circ\text{K.}$	<u>1,2</u>
Ethyl Hydroperoxide	$\text{C}_2\text{H}_5\text{OOH}$	1.3801	glass <u>-100</u>	$\log p = 8.834-2228/T.^\circ\text{K.}$	<u>1,2,3,4,5</u>
Propyl Hydroperoxide	$\text{C}_3\text{H}_7\text{OOH}$	$n_D^{25}=1.3890$	glass <u>-90</u>	35/20	<u>4,6</u>
isoPropyl Hydroperoxide	$\begin{array}{c} \text{CH}_3 \\ \diagup \\ \text{C} \\ \diagdown \\ \text{CH}_3 \end{array} \text{COOH}$	$n_D^{23}=1.8861$	—	107 to 109/760	<u>5,6</u>
tert-Butyl Hydroperoxide*	$(\text{CH}_3)_3\text{COOH}$	1.4007	-8 to -10	$\log p = 8.891-2342/T.^\circ\text{K.}$	<u>2,5,7,8,9</u> <u>10,11</u>
tert-Amyl Hydroperoxide	$\text{C}_2\text{H}_5(\text{CH}_3)_2\text{COOH}$	1.4161	—	26/3	<u>5,12</u>
Triethylmethyl Hydroperoxide	$(\text{CH}_3\text{CH}_2)_3\text{COOH}$	1.4379	2 to 3	27.5 to 28/2	<u>9,10,13</u>

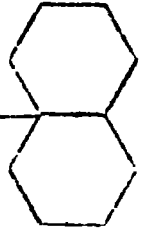
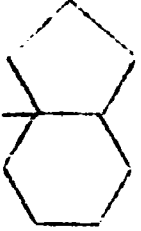
*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm.Hg.}$	Literature Reference**
1,1,2,2-Tetramethyl- ethyl Hydroperoxide	$ \begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ \quad \\ \text{CH} - \text{COOH} \\ \quad \\ \text{CH}_3 \quad \text{CH}_3 \end{array} $	—	—	51 to 58/12	<u>10</u>
Artylmethylmethyl Hydroperoxide	$ \begin{array}{c} \text{CH}_3 \\ \\ \text{C}_6\text{H}_{11} - \text{COOH} \\ \\ \text{H} \end{array} $	1.4305	—	58/0.08	<u>14</u>
Pentamethylethyl Hydroperoxide	$ \begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ \quad \\ \text{CH}_3 - \text{C} - \text{COOH} \\ \quad \\ \text{CH}_3 \quad \text{CH}_3 \end{array} $	—	113 to 114	—	<u>10, 13</u>
Cyclohexyl* Hydroperoxide		$n_D^{25} = 1.4638$	-20	—	<u>15</u>
1-Methylcyclohexyl Hydroperoxide-1*		1.4642	—	53/0.1	<u>10, 16, 17</u>

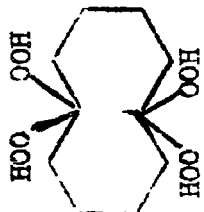
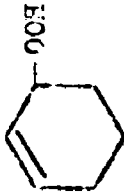
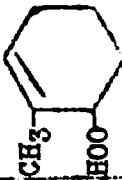
*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm.Hg.}$	Literature Reference**
<u>transDecalin</u> [*] Hydroperoxide-9	OOH 	—	94 to 95	—	<u>10</u>
<u>transHydrindane</u> [*] Hydroperoxide-8	OOH 	—	—	73 to 75/0.2	<u>18</u>
2,5-Dihydroperoxy-2,5-dimethylhexane*	OOH OOH CH ₃ -C-CH ₂ CH ₂ -C-CH ₃ CH ₃ CH ₃	—	106.5	—	10, <u>19</u>
2,7-Dihydroperoxy-2,7-dimethyloctane	OOH OOH CH ₃ -C-CH ₂ CH ₂ CH ₂ CH ₂ -C-CH ₃ CH ₃ CH ₃	—	66	—	<u>10</u>
2-(2,4-Dimethyl-pentanone-3-yl) [*] hydroperoxide	OOH (CH ₃) ₂ C-C-CH(CH ₃) ₂ O	1.4321	—	62 to 69/0.8	<u>107</u>

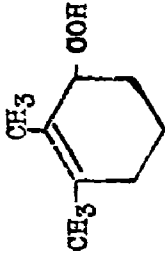
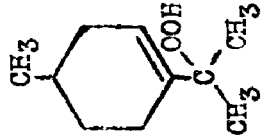
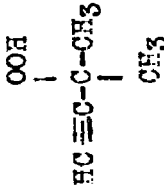
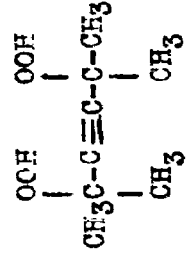
*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

** The physical constants are taken from the underlined reference.

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm}, \text{Hg}$.	Literature Reference**
9,9,10,10-Tetrahydro- peroxycyclodecane		—	116 to 118	—	<u>10</u>
B. Olefin Hydroperoxides					
Cyclopentene-1- hydroperoxide-3		—	—	35/0.01	<u>20</u>
Cyclohexene-1- hydroperoxide-3		$n_D^{20} = 30.75$	—	51/0.3	<u>20, 21</u>
1-methylcyclohexene- 1-hydroperoxide-6		—	—	64 to 67/0.2	<u>20, 21, 22</u>

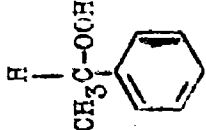
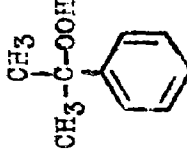
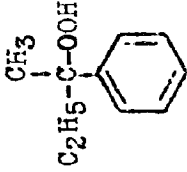
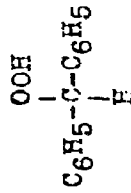
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Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm.Hg.}$	Literature Reference**
1,2-Dimethylcyclohexene- 1-hydroperoxide-3*		—	—	67 to 70/0.5	<u>19,20</u>
d,l-3-p-Mentheryl Hydroperoxide*		1.47812	—	57.5/0.05	<u>23</u>
3-Methyl-3-hydroperoxy- butyne-1		$n_D^{25} = 1.4295$	—	42 to 42.2/17	<u>24</u>
2,5-Dimethyl-2,5-dihydro- peroxyhexyne-3		—	107 to 109 (dec.)	—	<u>24</u>

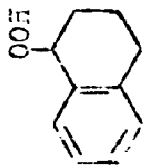
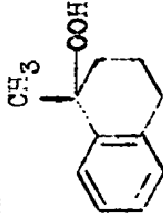
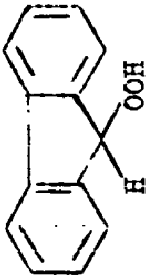
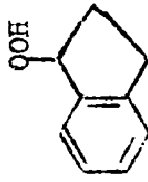
*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm.Hg.}$	Literature Reference**
C. Arylalkyl Hydroperoxides					
Phenylmethylmethyl* Hydroperoxide		1.52695	—	45/0.05	<u>25</u>
Phenylmethylmethyl* Hydroperoxide (cumene hydroperoxide)		1.5237	—	65/0.18	<u>26, 27, 28, 106</u>
Phenylmethylethyl* methyl hydroperoxide		1.5208	—	48 to 49/0.002	<u>29, 30</u>
Diphenylmethyl* hydroperoxide		—	51	—	<u>27</u>
Triphenylmethyl* Hydroperoxide	$(\text{C}_6\text{H}_5)_3\text{C}-\text{OOH}$	—	82	—	<u>31, 32, 33</u>

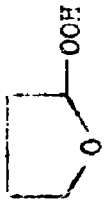
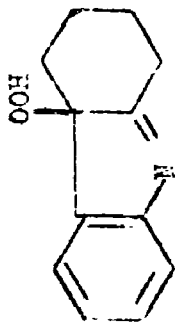
*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

Name	Formula	Refractivity n_D^{20}	Melting Point °C.	Boiling Point °C/mm.Hg.	Literature Reference**
1,2,3,4-Tetrahydronaphthalene Hydroperoxide-1* (Tetralin Hydroperoxide)		$n_D^{78.7} = 1.54471$ He	56	—	<u>34,35</u>
1-Methyl-1,2,3,4-tetrahydronaphthalene* Hydroperoxide-1		—	—	99 to 100/0.01	<u>31</u>
9-Fluoranyl Hydroperoxide*		—	93	—	<u>36</u>
1-Hydrindene* Hydroperoxide*		1.56214	—	64 to 65/0.01	<u>37</u>

*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm. Hg}$.	Literature Reference**
D. Hydroperoxides of Heterocyclic Compounds					
Tetrahydrofuryl Hydroperoxide*		1.6933	—	—	<u>38</u>
Tetrahydrocarbazole Hydroperoxide*	 (structure not proven)	—	123 to 124	—	<u>39</u>
Hydroperoxides having the structure, $\text{R}_1\text{N}=\text{N}-\underset{\text{R}_3}{\overset{\text{OOH}}{\text{C}}}-\text{R}_2$, prepared by autooxidation of the hydrazones of ketones and aldehydes and where R_1 , R_2 , R_3 are hydrogen, alkyl or aryl groups.					
					<u>40</u>

*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

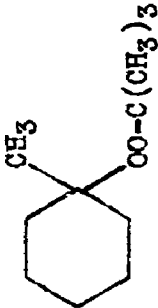
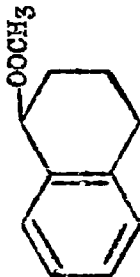
**The physical constants are taken from the underlined reference.

2. PEROXIDES OF STRUCTURE ROOR (DIALKYL PEROXIDES)

Name	Formula	Refractivity 20° n _D	Melting Point °C.	Boiling Point °C/mm.Hg.	Literature Reference**
A. Dialkyl Peroxides					
Dimethyl Peroxide	CH ₃ OOCH ₃	1.35029	-100 to -105	13.5/740	41, 42, 43
Methylethyl Peroxide	CH ₃ OOCH ₂ H ₅	1.3698	-68 to -69.5	log p= 7.356-1517/T°K.	2, 43
Diethyl Peroxide	C ₂ H ₅ OOCH ₂ H ₅	1.37156	—	64/740	41, 43, 44
Dipropyl Peroxide	C ₃ H ₇ OOCH ₂ H ₇	20.5 n _D = 1.3911	—	—	3, 4, 41, 43
Diisopropyl Peroxide	$ \begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ \diagdown \quad \diagup \\ \text{CHOOCH} \\ \diagup \quad \diagdown \\ \text{CH}_3 \quad \text{CH}_3 \end{array} $	—	—	53 to 54/760	45
Methyltertbutyl Peroxide	CH ₃ OOCH(CH ₃) ₃	1.3761	-102.1	23/119	46
Ethyltertbutyl Peroxide	C ₂ H ₅ OOCH(CH ₃) ₃	1.3840	-83.1	35/84	46
isopropyltertbutyl Peroxide	$ \begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ \diagdown \quad \diagup \\ \text{CHOOCH} \\ \diagup \quad \diagdown \\ \text{CH}_3 \quad \text{CH}_3 \end{array} $	1.3860	glass	52/125	46

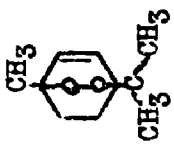
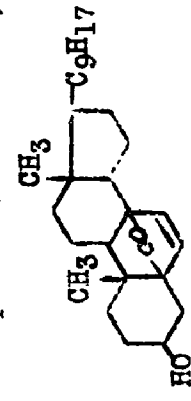
*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm. Hg.}$	Literature Reference**
n-Butyltertbutyl Peroxide	$n\text{-C}_4\text{H}_9\text{OOC}(\text{CH}_3)_3$	1.4001	glass	53/30	<u>46</u>
sec-Butyltertbutyl Peroxide	$\text{sec-C}_4\text{H}_9\cdot\text{OOC}(\text{CH}_3)_3$	1.3959	-67.7	53/50	<u>46</u>
Di-tertbutyl Peroxide*	$(\text{CH}_3)_3\text{C}\cdot\text{OOC}(\text{CH}_3)_3$	1.3890	-40.0	111/760	<u>46</u>
tert-Butyltertbutyl Peroxide*	$(\text{CH}_3)_3\text{COOC}(\text{CH}_3)_3\text{C}_2\text{H}_5$	1.4000	—	91 to 92/760	<u>47</u>
Di-tertbutyl Peroxide*	$\text{C}_2\text{H}_5(\text{CH}_3)_2\text{COOC}(\text{CH}_3)_2\text{C}_2\text{H}_5$	1.4091	—	58.5/14	<u>11, 47</u>
tert-Butyl-1-methyl- cyclohexyl-1-Peroxide		1.4350	—	28 to 29/2.5	<u>13</u>
Tetrahydronaphthyl- methyl Peroxide		1.53406	—	72.5/0.03	<u>23</u>

*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

Name	Formula	Refractivity n_D^{20}	Melting Point °C.	Boiling Point °C/mm.Hg.	Literature Reference**
B. Hexamethylene Peroxides					
Di-triphenylmethyl Peroxide*	$(C_6H_5)_3COOC(C_6H_5)_3$	—	185 to 186	—	<u>48</u>
A wide variety of other hexamethylene peroxides have been prepared by the oxidation of symmetrical or unsymmetrical hexamethylene derivatives; consult, for example, reference (49).					
C. Transannular Peroxides					
Ascaridole		$n_D^{25} = 1.4763$	—	96 to 97/8	<u>50, 51, 52</u>
Ergosterol Peroxide*	(Most probable structure) 	—	178	—	<u>53, 54</u>
Anthracene Peroxide*		—	120 (decomposes)	—	<u>54, 55</u>

*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

Name	Formula	Refractivity n_D^{20}	Melting Point °C.	Boiling Point °C/mm.Hg.	Literature Reference**
Rubrene Peroxide*		—	Starts to lose oxygen at 100°C.	—	54, <u>56</u>
Cyclchexadiene Peroxide*		$n_D^{85} = 1.453$	82 to 83	40 to 55/0.3	50
2,8-endo-Peroxy- <u>isoidene</u> *		$n_D^{22} = 1.566$	15 to 18	80/0.1	36, <u>50</u>

* These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

** The physical constants are taken from the underlined reference.

3. PEROXIDES OF STRUCTURE $\text{RC}(=\text{O})\text{OOH}$ (PERACIDS)

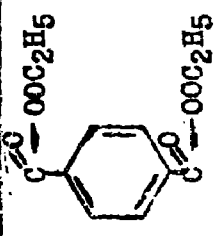
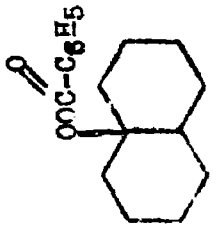
Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm.Hg.}$	Literature Reference**
A. Aliphatic Peracids					
Performic Acid*	$\text{HC}(=\text{O})\text{OOH}$ (not isolated in pure form)	—	—	—	57, 58
Peracetic Acid*	$\text{CH}_3\text{C}(=\text{O})\text{OOH}$	—	0.1	20 to 30/10 to 20	59, 60, 61, 62
Perpropionic Acid*	$\text{C}_2\text{H}_5\text{C}(=\text{O})\text{OOH}$	—	-13.5	—	59, 61, 62, 63
Percaproic Acid	$\text{C}_4\text{H}_9\text{C}(=\text{O})\text{OOH}$	—	15	61 to 62/13	64
Permonochloroacetic Acid	$\text{CH}_2\text{ClC}(=\text{O})\text{OOH}$	—	—	33 to 34 (decomp.)	65, 66
B. Aromatic Peracids					
Perbenzoic Acid*	$\text{C}_6\text{H}_5\text{C}(=\text{O})\text{OOH}$	—	41	97 to 110/13 to 15	62, 67
Monoperphthalic Acid		—	110 (decomp.)	—	62, 67

*These peroxides have been prepared by oxidation of the corresponding hydrocarbon with molecular oxygen.

**The physical constants are taken from the underlined reference.

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4. PEROXIDES OF STRUCTURE RC-OO-R (PERESTERS)

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm.Hg}$.	Literature Reference*
Ethyl peracetate	$\text{CH}_3\text{C}(=\text{O})\text{—OOC}_2\text{H}_5$ (properties not given)	—	—	—	<u>68</u>
Diethylperterephthalate		—	37	—	<u>68</u>
<u>trans</u> -9-Decalylperbenzoate		—	67 to 68	—	<u>69</u>
<u>tert</u> -Butyl perbenzoate	$\text{C}_6\text{H}_5\text{C}(=\text{O})\text{—OOC}(\text{CH}_3)_3$	1.5007	—	75 to 77/2	<u>70</u>

*The physical constants are taken from the underlined reference.

5. PEROXIDES OF STRUCTURE $\text{RC}(\text{O})_2\text{OOC-R}$

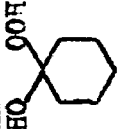
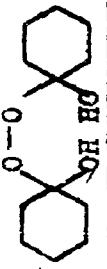
Name	Formula	Melting Point °C.	Boiling Point °C/mm.Hg.	Literature Reference*
A. Diacyl Peroxides				
Diacetyl Peroxide	$(\text{CH}_3\text{C}(\text{O})\text{O})_2$	30	63/21	<u>71, 72, 73</u>
Di-chloroacetyl Peroxide	$(\text{CH}_2\text{ClC}(\text{O})\text{O})_2$	36	85 (decomp.)	<u>74</u>
Di-n-butyl Peroxide	$(\text{CH}_3\text{CH}_2\text{CH}_2\text{C}(\text{O})\text{O})_2$ (Properties not given)	—	—	75
Di-phenylacetyl Peroxide	$(\text{C}_6\text{H}_5\text{CH}_2\text{C}(\text{O})\text{O})_2$ (Properties not given)	—	—	76
Di- α -thionyl Peroxide	$(\text{C}_4\text{H}_6\text{S}(\text{C}(\text{O})\text{O})_2)_2$	92 to 93 (dec.)	—	<u>77</u>

*Physical constants are taken from the underlined reference.

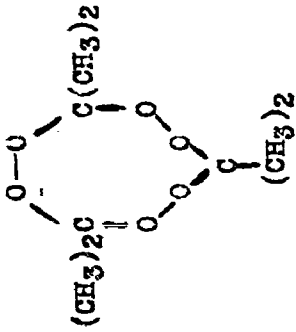
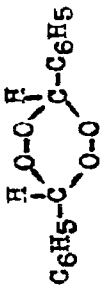
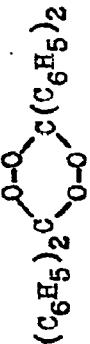
Name	Formula	Melting Point °C.	Solvent for recrystallization	Literature Reference*
B. Diaroyl Peroxides				
Dibenzoyl Peroxide	$\left(\text{C}_6\text{H}_5\text{C}(=\text{O})\text{O} \right)_2$	106 to 107 (dec.)	2:1 MeOH-CHCl ₃	<u>78, 79</u>
p,p'-Dimethoxybenzoyl Peroxide	$\left(\text{p-CH}_3\text{OC}_6\text{H}_4\text{C}(=\text{O})\text{O} \right)_2$	129 (dec.)	Benzene	<u>79, 80</u>
p-Monomethoxybenzoyl Peroxide	$\text{p-CH}_3\text{OC}_6\text{H}_4\text{C}(=\text{O})\text{O}$ $\text{C}_6\text{H}_5\text{C}(=\text{O})\text{O}$	68 to 74	3:1 Cyclohexane-Benzene	<u>79, 81</u>
p,p'-Dinitrobenzoyl Peroxide	$\left(\text{p-NO}_2\text{C}_6\text{H}_4\text{C}(=\text{O})\text{O} \right)_2$	158 (dec.)	Benzene	<u>79, 82</u>
A number of other substituted diaroyl peroxides are described in reference (79).				
C. Dialkyl Peroxydicarbonates				
Diethyl Peroxydicarbonate	$\text{C}_2\text{H}_5\text{OC}(=\text{O})\text{OC}(=\text{O})\text{C}_2\text{H}_5$	28 to 35 (dec.)	$n_D^{20} = 1.4017$	<u>83</u>
A number of other dialkyl peroxydicarbonates are described in reference (83b).				

*Physical constants are taken from the underlined reference

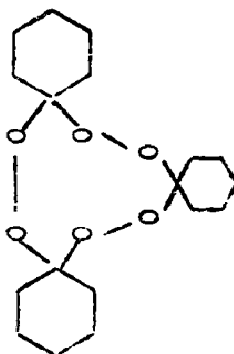
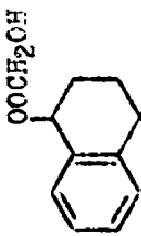
6. PEROXY DERIVATIVES OF ALDEHYDES AND KETONES

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm.Hg.}$	Literature Reference**
A. Hydroxyalkyl Hydroperoxides					
Hydroxymethyl Hydroperoxide	$\text{HOCH}_2\cdot\text{OOH}$	$n_D^{16} = 1.4205$	—	—	<u>84</u>
α -Hydroxyethyl Hydroperoxide	$\text{CH}_3\text{CH}(\text{OH})\text{OOH}$	$n_D^{24} = 1.4150$	—	—	<u>85, 86</u>
α -Hydroxyheptyl Hydroperoxide	$\text{C}_6\text{H}_{13}\text{CH}(\text{OH})\text{OOH}$	—	40	—	<u>85</u>
α -Hydroxydodecyl Hydroperoxide	$\text{C}_{11}\text{H}_{23}\text{CH}(\text{OH})\text{OOH}$	—	65 to 67	—	<u>85, 87</u>
1-Hydroxycyclohexyl Hydroperoxide-1		—	76 to 78	—	<u>88</u>
B. Bishydroxyalkyl Peroxides					
bis-Hydroxymethyl Peroxide	$\text{CH}_2(\text{OH})\text{OOCH}_2(\text{OH})$	—	62 to 64	—	<u>89, 90</u>
bis-Hydroxyethyl Peroxide	$\text{CH}_3\text{CH}(\text{OH})\text{OOCH}(\text{OH})\text{CH}_3$	$n_D^{16} = 1.4265$	—	—	<u>89</u>
Dihydroxydibenzal Peroxide	$\text{C}_6\text{H}_5\text{CH}(\text{OH})\text{OOCH}(\text{OH})\text{C}_6\text{H}_5$	—	—	—	<u>91, 92</u>
bis- α -Hydroxy- β, β , - trichlorethyl Peroxide	$\text{CCl}_3\text{CH}(\text{OH})\text{OOCH}(\text{OH})\text{CCl}_3$	—	122	—	<u>92</u>
bis-Hydroxycyclohexyl Peroxide		—	68 to 70	—	<u>88, 93</u>

*The physical constants are taken from the underlined reference.

Name	Formula	Refractivity n_D^{20}	Melting Point °C.	Boiling Point °C/mm.Hg.	Literature Reference*
C. Polyalkylidene Peroxides					
Dimeric Acetone Peroxide		—	132	—	93, 94, 95, 96, 97
Trimeric Acetone Peroxide	 (Structure not proven)	—	98.5	—	94, 95, 96, 97, 98
Dimeric Benzaldehyde Peroxide		—	202	—	99
Dimeric Benzophenone Peroxide		—	212.5	—	100

*The physical constants are taken from the underlined reference.

Name	Formula	Refractivity $n_D^{20^\circ}$	Melting Point $^\circ\text{C}$.	Boiling Point $^\circ\text{C}/\text{mm.Hg.}$	Literature Reference*
Trimeric Cyclohexanone Peroxide	 (Structure not Proven)	—	93	—	<u>93</u>
D. Monohydroxydialkyl Peroxides					
Methylhydroxy-methyl Peroxide	$\text{C}_2\text{F}_3\text{OOCH}_2\text{OH}$	$n_D^{15} = 1.3983$	—	45/17	<u>101</u>
Ethylhydroxy-methyl Peroxide	$\text{C}_2\text{H}_5\text{OOCH}_2\text{OH}$	$n_D^{16} = 1.4043$	—	46 to 48/13	<u>101</u>
Tetrahydroxymethyl Peroxide	 OOCH_2OH	—	46.5	—	<u>102</u>
t-Butylhydroxymethyl Peroxide	$(\text{CH}_3)_3\text{COOCH}_2\text{OH}$	1.4123	—	—	103, 104, <u>105</u>
Methyl- α -hydroxyethyl Peroxide	$\text{CH}_3\text{CH}(\text{OH})\text{OOCH}_3$	$n_D^{15} = 1.3930$	—	29 to 31/22	<u>101</u>

*The physical constants are taken from the underlined reference.

Name	Formula	Refractivity n_D^{20}	Melting Point °C.	Boiling Point °C/mm.Hg.	Literature Reference*
Ethyl- α -hydroxyethyl Peroxide	$\text{CH}_3\text{CH}(\text{OH})\text{OOC}_2\text{H}_5$	$n_D^{21.4} = 1.4021$	—	50 to 52/50	<u>101</u>
t-Butyl- α -hydroxy- β, β, β trichlorethyl Peroxide	$(\text{CH}_3)_3\text{COOC}\overset{\text{H}}{\underset{\text{OH}}{\text{C}}}\text{Cl}$	—	50 to 51	—	103, 104, <u>105</u>
E. Peracetals					
2,2-bis-t-Butyl- peroxypropane	$(\text{CH}_3)_3\text{COOC}\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}\text{OC}(\text{CH}_3)_3$	1.4098	—	—	103, 104, <u>105</u>
bis-t-Butylperoxy phenylmethane	$(\text{CH}_3)_3\text{COOC}\overset{\text{H}}{\underset{\text{C}_6\text{H}_5}{\text{C}}}\text{OC}(\text{CH}_3)_3$	1.5770	—	—	103, 104, <u>105</u>
2,2-bis-t-Butyl- peroxy-4-pentane	$(\text{CH}_3)_3\text{COOC}\overset{\text{CH}_3}{\underset{\text{CH}_3 \text{ C}_2\text{H}_5}{\text{C}}}\text{OC}(\text{CH}_3)_3$	1.4200	—	—	103, 104, <u>105</u>
A number of other per-acetals are reported in reference (105)					

*The physical constants are taken from the underlined reference.

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