# DICTIONARY OF ORGANIC COMPOUNDS
# HEILBRON

# DICTIONARY OF ORGANIC COMPOUNDS

THE CONSTITUTION AND PHYSICAL AND CHEMICA PROPERTIES OF THE PRINCIPAL CARBON COMPOUNDS AND THEIR DERIVATIVES, TOGETHER WITH THE RELEVANT LITERATURE REFERENCES

VOLUME THREE

## NAPHTHACARBAZOLE — ZYGADENINE


*Edited by*

I. M. HEILBRON, D.S.O., D.Sc., Ph.D., F.I.C., F.R.S.

*Sir Samuel Hall Professor of Chemistry and Director of the Chemical Laboratories, The University, Manchester.*

AND

H. M. BUNBURY, M.Sc., A.I.C., Barrister-at-Law

*Imperial Chemical Industries Ltd.*

*Assistant Editor*

W. E. JONES, Ph.D., B.Sc., A.I.C.

*Authors*

J. H. BEYNON, Ph.D., M.Sc. D. H. COFFEY, M.Sc., W. DORAN, M.Sc., A.I.C., D. H. HEY, D.Sc., Ph.D., F.I.C., E. R. H. JONES, Ph.D., B.Sc., A. LOWE, Ph.D., M.Sc., A.I.C., A. McGookin, Ph.D., B.Sc., A.I.C.

*Assistant Authors*

T. BARR, B.Sc., A.I.C., P. G. CARTER, Ph.D., B.Sc., J. L. GRIEVE, Ph.D., B.Sc., A. S. HAIGH, Ph.D., B.Sc., A.I.C., S. H. HARPER, Ph.D., B.Sc., A.R.C.S.

*Readers*

J. W. BATTY, B.Sc., E. C. BUTTERWORTH, M.Sc., E. HAWORTH, M.Sc., T. KENNEDY, M.Sc., R. WILKINSON, M.Sc., H. R. WRIGHT, Ph.D., B.Sc., A.I.C.



1937

# DICTIONARY OF ORGANIC COMPOUNDS

## Volume III

# PREFACE

In presenting this, the third and final volume of the Dictionary of Organic Compounds, we again desire to express our appreciation of the many helpful suggestions which we have received from fellow chemists both in this country and in the United States.

In the preface to Volume II mention was made of the fact that although it was originally intended to be of the same size as the first volume, actually an additional 150 pages were found necessary in order to avoid exclusion of compounds of reasonable importance. The present volume has brought the same problem, and our Publishers have not demurred to our request to increase the size of the volume by the addition of another 100 pages, which has allowed us to extend the range of selected compounds. It has also enabled us to give added prominence to natural compounds, while at the same time more space has been found for compounds of industrial interest and chemotherapeutic value. Whilst the literature has been completely covered up to the end of 1936, opportunity has been taken to include references to many important papers which have appeared in 1937.

This volume brings to a close the task to which we first set our hands many years ago. Its completion has only been possible owing to the skill and enthusiasm of a staff of authors and readers whose numbers have been continuously increased as the intricate nature and magnitude of the problems became more evident.

Organic chemists will be glad to know that arrangements have been made whereby the practical experience gained during the past years will be utilised for the revision of this Dictionary at regular intervals, volume by volume.

Careful consideration has been given to the alternative of issuing periodical supplements. This, though at first sight attractive, has been rejected for reasons which will, we hope, commend themselves. In the first place, under the supplement procedure, the number of supplements grows as the years go on, and in the end the cost of the whole work becomes prohibitive. In the second place, the value of the Dictionary as a work of ready reference is progressively diminished, until ultimately, the number of supplements to be consulted is so great, and the duplication so serious, that a new Dictionary has to be prepared.

Under the arrangements proposed, it is hoped that revised volumes will be issued at regular intervals, beginning, we hope, in 1939. The three-volume format will thus be retained, and the work will remain self-indexing.

We desire once more to express our appreciation to Mrs. Bunbury for her most valued help, and to the printers for the extreme accuracy of the proofs.

I. M. H.
H. M. B.

*November, 1937.*

# TABLE OF ABBREVIATIONS

| | |
|---|---|
| *A* | Acid ($A_2$, two mols. of acid). |
| Abs. EtOH | Absolute alcohol. |
| AcOH | Acetic acid. |
| $Ac_2O$ | Acetic anhydride. |
| AcOEt | Ethyl acetate. |
| Add. | Additive. |
| Addn. | Addition. |
| A.G.F.A. | Aktien-Gesellschaft für Anilinfabrikation. |
| Alc. | Alcohol, alcoholic. |
| Alc. $NH_3$ | Alcoholic ammonia. |
| Alk. | Alkali, alkaline. |
| [α] | Specific rotation. |
| Amorph. | Amorphous |
| Anhyd. | Anhydrous. |
| Aq. | Aqueous. |
| Atm. | Atmosphere(s). |
| *B* | Base ($B_2$, two mols. of base). |
| Badische | Badische Anilin und Sodafabrik. |
| B.D.C. | British Dyestuffs Corporation. |
| Bibl. | Bibliography. |
| B. p. | Boiling point. |
| $C_p$ | Constant pressure. |
| $C_v$ | Constant volume. |
| Cal. | Calories. |
| Col. | Colour, coloration. |
| Comb. | Combustion. |
| Comp. | Compound. |
| Conc. | Concentrated. |
| Corr. | Corrected. |
| Crit. | Critical. |
| Cryst. | Crystals, crystalline, crystallise. |
| $(COOH)_2$ | Oxalic acid. |
| $(CH_2COOH)_2$ | Succinic acid. |
| D | Density. |
| *d* | Dextrorotatory. |
| *dl* | Racemic. Optically inactive by external compensation. |
| Decomp. | Decomposed, decomposition. |
| Deriv. | Derivative. |
| Dil. | Dilute. |
| Diss. | Dissolves, dissolved. |
| Dist. | Distil, distillation. |
| D.R.P. | German Patent. |
| E.P. | English Patent. |
| Et | Ethyl. |
| $Et_2O$ | Ether (diethyl ether). |
| EtOH | Ethyl alcohol. |
| Fluor. | Fluoresces, fluorescence. |
| F.p. | Freezing point. |
| F.P. | French Patent. |
| Form. | Formation. |
| gm. | Gramme(s). |
| Hyd. | Hydrolyses, hydrolysed, hydrolysis. |
| *i* | Optically inactive by internal compensation. |
| I.C.I. | Imperial Chemical Industries. |
| I.G. | Interessen Gemeinschaft Farbenindustrie Aktien-Gesellschaft. |
| Insol. | Insoluble. |
| Jap. P. | Japanese Patent. |
| *k* | Dissociation constant. |
| *l* | Lævorotatory. |
| Liq. | Liquid. |
| *m* | Meta (position). |
| Me | Methyl. |
| MeOH | Methyl alcohol. |
| $Me_2CO$ | Acetone. |
| Min. | Mineral (inorganic). |
| Misc. | Miscible. |
| M.L.B. | Meister, Lucius, & Brüning. |
| mm. | Millimetres. |
| Mod. | Moderately. |
| Mol. | Molecule, molecular, molar. |
| M. p. | Melting point. |
| *ms* | Meso (position). |
| MW. | Molecular weight (formula weight). |
| mgm. | Milligramme(s). |
| *n* | Normal (chain). |
| $n_D$ | Refractive index (D line, etc.). |
| NaHg | Sodium amalgam. |
| $NH_3$ | Ammonia, aqueous ammonia. |
| $NH_3.AgNO_3$ | Ammoniacal silver nitrate. |
| *o* | Ortho (position). |
| Ord. | Ordinary. |
| Org. | Organic. |
| Ox. | Oxidise, oxidation. |
| *p* | Para (position). |
| P | Patent. |
| Part. | Partly, partial. |
| Pet. ether | Petroleum ether. |
| $PhNO_2$ | Nitrobenzene. |
| PhOH | Phenol. |
| Ppd. | Precipitated. |
| Ppt. | Precipitate. |
| Pptn. | Precipitation. |
| Prac. | Practically. |
| Press. | Pressure(s). |
| ψ | Pseudo. |
| Py | Pyridine. |
| *r* | Racemic. |
| Red. | Reduce, reduction. |
| Sec. | Secondary. |
| Sol. | Soluble, solution. |
| Spar. | Sparingly. |
| Sp. gr. | Specific gravity. |
| Sp. heat | Specific heat. |
| Suppl. | Supplement. |
| Sym. | Symmetrical. |
| Temp. | Temperature(s). |
| Tert. | Tertiary. |
| Undecomp. | Undecomposed. |
| Unsym. | Unsymmetrical. |
| Vap. | Vaporisation. |
| Vol. | Volume. |



此为试读，需要完整PDF请访问：www.ertongbook.com

# JOURNAL ABBREVIATIONS

Journals not listed here are given their full titles in the text.

| | |
|---|---|
| *Am. Chem. J.* | American Chemical Journal. |
| *Am. J. Pharm.* | American Journal of Pharmacy. |
| *Am. J. Sci.* | American Journal of Science. |
| *Anales soc. españ fis. quím.* | Anales de la sociedad española de física y química. |
| *Ann.* | Annalen der Chemie. |
| *Ann. chim.* | Annales de chimie. |
| *Ann. chim. applicata* | Annali di chimica applicata. |
| *Ann. chim. phys.* | Annales de chimie et de physique. |
| *Ann. phys.* | Annales de physique. |
| *Ann. Physik* | Annalen der Physik. |
| *Ann. Rev. Biochem.* | Annual Review of Biochemistry. |
| *Arch. Pharm.* | Archiv der Pharmazie (und Berichte der deutschen pharmazeutischen Gesellschaft). |
| *Arkiv Kemi, Mineral. Geol.* | Arkiv för Kemi, Mineralogi och Geologi. |
| *Atti accad. Lincei* | Atti della reale accademia nazionale dei Lincei. |
| *Ber.* | Berichte der deutschen chemischen Gesellschaft. |
| *Ber. deut. pharm. Ges.* | Berichte der deutschen pharmazeutischen Gesellschaft. |
| *Ber. ges. Physiol. exptl. Pharmakol.* | Berichte über die gesamte Physiologie und experimentelle Pharmakologie. |
| *Biochem. J.* | Biochemical Journal. |
| *Biochem. Z.* | Biochemische Zeitschrift. |
| *Biol. Zentr.* | Biologisches Zentralblatt. |
| *Brit. Chem. Abstracts* | British Chemical Abstracts. |
| *Bull. Chem. Soc. Japan* | Bulletin of the Chemical Society of Japan. |
| *Bull. Imp. Inst.* | Bulletin of the Imperial Institute. |
| *Bull. sci. acad. roy. Belg.* | Bulletin de la classe des sciences, academie royale de Belgique. |
| *Bull. sci. pharmacol.* | Bulletin des sciences pharmacologiques. |
| *Bull. soc. chim.* | Bulletin de la société chimique de France. |
| *Bull. soc. chim. Belg.* | Bulletin de la société chimique de Belgique. |
| *Bull. soc. chim. biol.* | Bulletin de la société de chimie biologique. |
| *Can. Chem. Met.* | Canadian Chemistry and Metallurgy. |
| *Chem. Abstracts* | Chemical Abstracts (of the American Chemical Society). |
| *Chem. Ind.* | Die Chemische Industrie. |
| *Chem. Met. Eng.* | Chemical and Metallurgical Engineering. |
| *Chem. News* | Chemical News (and Journal of Industrial Science). |
| *Chem.-Tech. Rundschau* | Chemische-Technische Rundschau. |
| *Chem. Trade J.* | Chemical Trade Journal (and Chemical Engineer). |
| *Chem. Umschau** | Chemische Umschau (auf dem Gebiete der Fette, Oele, Wachse, und Harze). |
| *Chem. Weekblad* | Chemisch Weekblad. |
| *Chem. Zentr.* | Chemisches Zentralblatt. |
| *Chem.-Ztg.* | Chemiker-Zeitung. |
| *Compt. rend.* | Comptes rendus (hebdomadaires des séances de l'académie des sciences). |
| *Compt. rend. soc. biol.* | Comptes rendus des séances de la société de biologie. |
| *Dinglers polytech. J.* | Dinglers polytechnisches Journal. |
| *Gazz. chim. ital.* | Gazzetta chimica italiana. |
| *Giorn. chim. applicata* | Giornale di chimica applicata. |
| *Giorn. chim. ind.* | Giornale di chimica industriale. |
| *Giorn. chim. ind. applicata* | Giornale di chimica industriale ed applicata. |
| *Helv. Chim. Acta* | Helvetica Chimica Acta. |
| *Ind. Eng. Chem.* | Industrial and Engineering Chemistry. |
| *Jahresber. Fortschr. Chem.* | Jahresbericht über die Fortschritte der Chemie. |
| *J. Am. Chem. Soc.* | Journal of the American Chemical Society. |
| *J. Am. Pharm. Assocn.* | Journal of the American Pharmaceutical Association. |
| *Japan. J. Chem.* | Japanese Journal of Chemistry. |
| *J. Bact.* | Journal of Bacteriology. |
| *J. Biochem. Japan* | Journal of Biochemistry of Japan. |
| *J. Biol. Chem.* | Journal of Biological Chemistry. |
| *J. Chem. Ind. Japan* | Journal of Chemical Industry (Japan)† |
| *J. Chem. Physics* | Journal of Chemical Physics. |
| *J. Chem. Soc.* | Journal of the Chemical Society (London). |
| *J. Chem. Soc. Abstracts* | Abstracts of the Chemical Society (London). |
| *J. Chem. Soc. Japan* | Journal of the Chemical Society of Japan. |
| *J. chim. phys.* | Journal de chimie physique. |
| *J. Chinese Chem. Soc.* | Journal of the Chinese Chemical Society. |
| *J. Indian Chem. Soc.* | Journal of the Indian Chemical Society. |
| *J. Indian Inst. Sci.* | Journal of the Indian Institute of Science. |
| *J. Pharmacol.* | Journal of Pharmacology and Experimental Therapeutics. |
| *J. pharm. Belg.* | Journal de pharmacie de Belgique. |
| *J. pharm. chim.* | Journal de pharmacie et de chimie. |
| *J. Pharm. Soc. Japan* | Journal of the Pharmaceutical Society (Japan). |
| *J. Phys. Chem.* | Journal of Physical Chemistry. |
| *J. prakt. Chem.* | Journal für praktische Chemie. |
| *J. Russ. Phys.-Chem. Soc.* | Journal of the Russian Physical-Chemical Society. |

* Now Fettchemische Umschau (*Fettchem. Umschau*).

† Now *J. Soc. Chem. Ind. Japan*.

# LIST OF SUBSTITUENTS

**In the following table is given a list of the principal substituent groups as they are used in the dictionary.**

| | | |
|---|---|---|
| 1 | —F | Fluoro |
| 2 | —Cl | Chloro |
| 3 | —Br | Bromo |
| 4 | —I | Iodo |
| 5 | —NO | Nitroso |
| 6 | —$NO_2$ | Nitro |
| 7 | —N | Azido, Triazo |
| 8 | —OH | Hydroxy (*followed by* —$OCH_3$ Methoxy, —$OC_2H_5$ Ethoxy, —$OC_6H_5$ Phenoxy, —O·CO·$CH_3$, Acetoxy, *etc. in the order of the group attached to the oxygen*) |
| 9 | —SH | Mercapto |
| 10 | —SO | Thionyl |
| 11 | —$SO_2$ | Sulphonyl |
| 12 | —SCN | Thiocyano |
| 13 | =O (in C—CO—C) | Keto |
| 14 | >NH | Imino |
| 15 | =N·OH | Isonitroso, Oximino |
| 16 | —S— | Thio |
| 17 | —$SO_3H$ | Sulpho |
| 18 | —$NH_2$ | Amino |
| 19 | —NH·$C_6H_5$ | Anilino, Phenylimino |
| 20 | —NH·$C_6H_4$·$CH_3$ | Toluidino |
| 21 | —NH·CO·$NH_2$ | Ureido |
| 22 | —NH·C(:NH)·$NH_2$ | Guanidino |
| 23 | —NH·OH | Hydroxylamino |
| 24 | —NH·$NH_2$ | Hydrazino |
| 25 | —NH·NH— | Hydrazo |
| 26 | —N:N— | Azo |
| 27 | —N:N—(OH, Cl, etc.) | Diazonium, Diazo |
| 28 | —N=N— (Ö) (—N—N— / O) | Azoxy |
| 29 | —As:As— | Arseno |
| 30 | —NH·N:N— (*open*) | Diazoamino |
| 31 | —NH·N:N (*cyclic*) | Azimino |
| 32 | —$CH_3$ | Methyl |
| 33 | —$CH_2OH$ | Hydroxymethyl |
| 34 | —$C_2H_5$ | Ethyl |
| 35 | —$CH_2$·$CH_2$·$CH_3$ | *n*-Propyl |
| 36 | —$CH(CH_3)_2$ | Isopropyl |
| 37 | —$CH_2$·$CH_2$·$CH_2$·$CH_3$ | *n*-Butyl |
| 38 | —$CH_2$·$CH(CH_3)_2$ | Isobutyl |
| 39 | —$C(CH_3)_3$ | *tert.*-Butyl |
| 40 | —$CH_2$·$[CH_2]_2$·$CH_3$ | *n*-Amyl |
| 41 | —$CH(C_2H_5)_2$ | *sec.*-*n*-Amyl |
| 42 | —$CH_2$·$CH_2$·$CH(CH_3)_2$ | Isoamyl |
| 43 | —$CH_2$·CH($CH_3$)($C_2H_5$) | *active* Amyl |
| 44 | —C($CH_3$)($C_2H_5$)($CH_3$) | *tert.*-Amyl |
| 45 | —$CH_2$·$[CH_2]_3$·$CH_3$ | *n*-Hexyl |
| 46 | —$CH_2$·$[CH_2]_2$·$CH(CH_3)_2$ | Isohexyl |
| 47 | —$CH_2$·$[CH_2]_5$·$CH_3$ | *n*-Heptyl, Oenanthyl |
| 48 | —$CH_2$·$[CH_2]_5$·$CH(CH_3)_2$ | Isoheptyl |
| 49 | —$CH_2$·$[CH_2]_6$·$CH_3$ | Octyl, Capryl |
| 50 | —$CH_2$·$[CH_2]_7$·$CH_3$ | Nonyl |
| 51 | —$CH_2$·$[CH_2]_8$·$CH_3$ | Decyl |
| 52 | —$CH_2$·$[CH_2]_9$·$CH_3$ | Undecyl |
| 53 | —$CH_2$·$[CH_2]_{10}$·$CH_3$ | Dodecyl |
| 54 | —$CH_2$·$[CH_2]_{11}$·$CH_3$ | Tridecyl |
| 55 | —$CH_2$·$[CH_2]_{12}$·$CH_3$ | Tetradecyl |
| 56 | —$CH_2$·$[CH_2]_{13}$·$CH_3$ | Pentadecyl |
| 57 | —$CH_2$·$[CH_2]_{14}$·$CH_3$ | Cetyl, Hexadecyl |
| 58 | —$CH_2$·$[CH_2]_{15}$·$CH_3$ | Heptadecyl |
| 59 | —$CH_2$·$[CH_2]_{16}$·$CH_3$ | Octadecyl |
| 60 | —$CH_2$·$[CH_2]_{18}$·$CH_3$ | Eicosyl |
| 61 | —$CH_2$·$[CH_2]_{24}$·$CH_3$ | Ceryl |
| 62 | —$CH_2$·$[CH_2]_{28}$·$CH_3$ | Myricyl, Melissyl |
| 63 | —CH($CH_2$—$CH_2$) | Cyclopropyl (*followed by* Cyclobutyl, Cyclopentyl, Cyclohexyl, Cycloheptyl (Suberyl), *in that order*) |
| 64 | —CH:$CH_2$ | Vinyl |
| 65 | —CH:CH·$CH_3$ | Propenyl |
| 66 | —C(:$CH_2$)·$CH_3$ | Isopropenyl |
| 67 | —$CH_2$·CH:$CH_2$ | Allyl |
| 68 | —CH:CH·$CH_2$·$CH_3$ | *α*-Butenyl |
| 69 | —$CH_2$·CH:CH·$CH_3$ | *β*-Butenyl, Crotonyl |
| 70 | —$CH_2$·$CH_2$·CH:$CH_2$ | *γ*-Butenyl, Allylomethyl |
| 71 | —$CH_2$·$[CH_2]_7$·CH:CH·$[CH_2]_7$·$CH_3$ | Octadecenyl |
| 72 | —C:CH | Acetylenyl, Ethinyl |
| 73 | —$CH_2$·C:CH | Propargyl |
| 74 | —$C_6H_5$ | Phenyl |
| 75 | —$C_6H_4$·$CH_3$ | Tolyl |
| 76 | —$CH_2$·$C_6H_5$ | Benzyl |
| 77 | —$CH_2$·$C_6H_4$·OH (*-o*) | Salicyl |
| 78 | —$CH_2$·$C_6H_4$·$OCH_3$ (*-p*) | Anisyl |
| 79 | —$CH_2$·$CH_2$·$C_6H_5$ | Phenylethyl |
| 80 | —$CH_2$·$C_6H_4$·$CH_3$ | Xylyl |
| 81 | —$C_6H_4$·$CH(CH_3)_2$ | Cumyl |
| 82 | —$C_6H_3(CH_3)_2$ (1 : 2 : 4) | *ψ*-Cumyl |
| 83 | —$C_6H_3(CH_3)_2$ (1 : 3 : 5) | Mesityl |
| 84 | —CH:CH·$C_6H_5$ | Styryl |
| 85 | —$CH_2$·CH:CH·$C_6H_5$ | Cinnamyl |
| 86 | —$C_{10}H_7$ | Naphthyl |
| 87 | —$C_6H_4$·$C_6H_5$ | Diphenylyl, Xenyl |
| 88 | $C_6H_5$·CH·$C_6H_5$ | Benzhydryl, Diphenylmethyl |
| 89 | —$C_{14}H_9$ | Anthryl, anthranyl |
| 90 | —$C_{14}H_9$ | Phenanthryl |
| 91 | —C($C_6H_5$)$_3$ | Triphenylmethyl |
| 92 | —$CH_2$·$CH_2$— | Ethylene, Dimethylene |
| 93 | —CH($CH_3$)·$CH_2$— | Propylene |
| 94 | —$CH_2$·$CH_2$·$CH_2$— | Trimethylene |
| 95 | —$CH_2$·$CH_2$·$CH_2$·$CH_2$— | Tetramethylene |
| 96 | —C($CH_3$)$_2$·$CH_2$— | Isobutylene |
| 97 | —$CH_2$·$[CH_2]_3$·$CH_2$— | Pentamethylene |
| 98 | —$CH_2$·$[CH_2]_4$·$CH_2$— | Hexamethylene |
| 99 | —$CH_2$·$[CH_2]_5$·$CH_2$— | Heptamethylene |
| 100 | —$CH_2$·$[CH_2]_6$·$CH_2$— | Octamethylene |
| 101 | —CH:CH— | Vinylene |
| 102 | —$C_6H_4$— | Phenylene |
| 103 | —$C_6H_3(CH_3)$— | Tolylene |

| | | |
|---|---|---|
| 104 | —$CH_2$— | Methylene |
| 105 | $=CH\cdot CH_3$ | Ethylidene |
| 106 | $=CH\cdot CH_2\cdot CH_3$ | Propylidene |
| 107 | $=C(CH_3)_2$ | Isopropylidene |
| 108 | $=CH\cdot CH_2\cdot CH_2\cdot CH_3$ | Butylidene |
| 109 | $=CH\cdot CH(CH_3)_2$ | Isobutylidene |
| 110 | $=C{:}CH_2$ | Vinylidene |
| 111 | $=CH\cdot CH{:}CH_2$ | Allylidene |
| 112 | $=CH\cdot C_6H_5$ | Benzylidene |
| 113 | $=CH\cdot C_6H_4\cdot OH$ (*-o*) | Salicylidene |
| 114 | $=CH\cdot C_6H_4\cdot OCH_3$ (*-p*) | Anisylidene |
| 115 | $=CH\cdot C_6H_4\cdot CH(CH_3)_2$ (*-p*) | Cuminylidene |
| 116 | $=CH\cdot CH{:}CH\cdot C_6H_5$ | Cinnamylidene |
| 117 | $—CH_2\cdot CO\cdot CH_3$ | Acetonyl |
| 118 | $—CH_2\cdot CO\cdot C_6H_5$ | Phenacyl |
| 119 | $—CH_2\cdot CO\cdot C_6H_4\cdot CH_3$ | Tolacyl |
| 120 | $C_6H_5\cdot CH\cdot CO\cdot C_6H_5$ | Desyl |
| 121 | —CHO | Aldehydo, Formyl |
| 122 | $\equiv CH$ | Methinyl |
| 123 | $—CO\cdot CH_3$ | Acetyl, Aceto |
| 124 | $—CO\cdot CH_2\cdot CH_3$ | Propionyl |
| 125 | $—CO\cdot CH_2\cdot CH_2\cdot CH_3$ | Butyryl |
| 126 | $—CO\cdot CH(CH_3)_2$ | Isobutyryl |
| 127 | $—CO\cdot CH_2\cdot [CH_2]_2\cdot CH_3$ | Valeryl |
| 128 | $—CO\cdot CH_2\cdot CH(CH_3)_2$ | Isovaleryl |
| 129 | $—CO\cdot CH_2\cdot [CH_2]_3\cdot CH_3$ | Caproyl |
| 130 | $—CO\cdot CH_2\cdot [CH_2]_{13}\cdot CH_3$ | Palmityl |
| 131 | $—CO\cdot CH_2\cdot [CH_2]_{16}\cdot CH_3$ | Stearyl |
| 132 | $—CO\cdot [CH_2]_7\cdot CH{:}CH\cdot [CH_2]_7\cdot CH_3$ | Oleyl |
| 133 | $—CO\cdot C_6H_5$ | Benzoyl |
| 134 | $—CO\cdot C_6H_4\cdot OH$ (*-o*) | Salicyloyl |
| 135 | $—CO\cdot C_6H_4\cdot OCH_3$ (*-p*) | Anisoyl |
| 136 | $—CO\cdot CH_2\cdot C_6H_5$ | Phenylacetyl |
| 137 | $—CO\cdot C_6H_4\cdot CH_3$ | Toluyl |
| 138 | $—CO\cdot CH{:}CH\cdot C_6H_5$ | Cinnamoyl |
| 139 | $—CO\cdot C_{10}H_7$ | Naphthoyl |
| 140 | —CO·CO— | Oxalyl |
| 141 | $—CO\cdot CH_2\cdot CO—$ | Malonyl |
| 142 | $—CO\cdot CH_2\cdot CH_2\cdot CO—$ | Succinyl |
| 143 | $—CO\cdot C_6H_4\cdot CO—$ | Phthaloyl, Isophthaloyl, Terephthaloyl |
| 144 | —COOH (—CO·$OCH_3$, —CO·$OC_2H_5$, etc.) | Carboxy, (Carbomethoxy, Carbethoxy, etc.) |
| 145 | $—CO\cdot NH_2$ | Carbamyl |
| 146 | >CO | Carbonyl |
| 147 | $—C(:NH)\cdot NH_2$ | Guanyl |
| 148 | —CN | Cyano |
| 149 | $—CO\cdot CH_2NH_2$ | Glycyl |
| 150 | $—CO\cdot CH(NH_2)\cdot CH_3$ | α-Alanyl |
| 151 | $—CO\cdot CH_2\cdot CH_2NH_2$ | β-Alanyl |
| 152 | $—CO\cdot CH(NH_2)\cdot CH(CH_3)_2$ | Valyl |
| 153 | $—CO\cdot CH(NH_2)\cdot CH_2\cdot CH(CH_3)_2$ | Leucyl |
| 154 | $—CO\cdot CH_2\cdot NH\cdot CO\cdot C_6H_5$ | Hippuryl |
| 155 | $—C_4H_3O$ | Furyl |
| 156 | $—C_4H_3S$ | Thienyl |
| 157 | $—CH_2\cdot C_4H_3O$ | Furfuryl |
| 158 | $=CH\cdot C_4H_3O$ | Furfurylidene |
| 159 | $—CO\cdot C_4H_3O$ | Furoyl, Pyromucyl |
| 160 | $—C_4H_3NH$ | Pyrryl |
| 161 | $—C_5H_4N$ | Pyridyl |

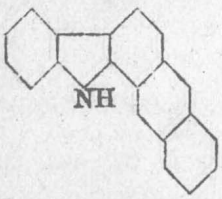
# DICTIONARY OF ORGANIC COMPOUNDS

## Volume III

# DICTIONARY OF ORGANIC COMPOUNDS

## N

**2 : 3-Naphthacarbazole**




$C_{20}H_{13}N$ MW, 267

Yellow leaflets with greenish fluor. M.p. 325°. Very spar. sol. org. solvents. Conc. $H_2SO_4$ ⟶ deep blue col.

Braun, Bayer, *Ann.*, 1929, **472**, 97, 101.

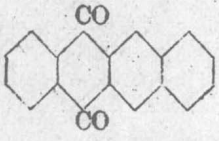
**Naphthacene** (2 : 3-*Benzanthracene*)

$C_{18}H_{12}$ MW, 228

Orange-red leaflets from xylene. M.p. 341° (335–6°, 331°). Sublimes ⟶ greenish-yellow vapour. Sol. conc. $H_2SO_4$ ⟶ dull green col. Insol. $C_6H_6$. Fuming $HNO_3$ ⟶ naphthacenequinone

Clar, *Ber.*, 1932, **65**, 517.
Dziewoński, Ritt, *Chem. Abstracts*, 1928, **22**, 2561.
Deichler, Weizmann, *Ber.*, 1903, **36**, 552.

**Naphthacenequinone** (2 : 3-*Benzanthraquinone*, lin-*benzanthraquinone*, 2 : 3-*phthaloylnaphthalene*)




$C_{18}H_{10}O_2$ MW, 258

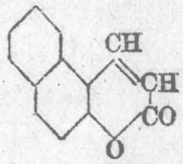
Cryst. from $PhNO_2$ in yellow needles. M.p. 294° (285°). Sublimes. Sol. conc. $H_2SO_4$ ⟶ red-violet col. Spar. sol. hot $C_6H_6$, hot $Me_2CO$. Very spar. sol. AcOH. Sn + AcOH ⟶ yellow needles of the anthrone, m.p. 196°, sol. conc. $H_2SO_4$ to bright red sol. Sn + $Ac_2O$ + AcONa ⟶ orange needles of naphthacenehydroquinone-diacetate, m.p. 269°.

Fieser, *J. Am. Chem. Soc.*, 1931, **53**, 2336.
Waldmann, Mathiowetz, *Ber.*, 1931, **64**, 1713.

**Naphthacetin.**
*See under* 4-Amino-1-naphthol.

**Naphthacetol.**
*See under* 4-Amino-1-naphthol.

**α:β-Naphthacoumarin** (5:6-*Benzcoumarin*)

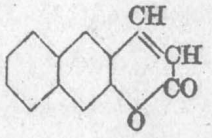



$C_{13}H_8O_2$ MW, 196

Bright yellow needles from EtOH.Aq. M.p. 118°. Sol. EtOH, $Et_2O$, $CHCl_3$, AcOH. Spar. sol. hot $H_2O$ ⟶ bluish fluor.

Dey, Rao, Sankaranarayanan, *J. Indian Chem. Soc.*, 1932, **9**, 71.

**β:β-Naphthacoumarin** (6:7-*Benzcoumarin*)

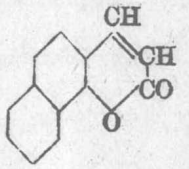



$C_{13}H_8O_2$ MW, 196

Pale yellowish cryst. from $CHCl_3$–pet. ether. M.p. 163–4°.

Boehm, Profft, *Arch. Pharm.*, 1931, **269**, 25 (*Chem. Zentr.*, 1931, I, 1922).

**β:α-Naphthacoumarin** (7:8-*Benzcoumarin*)



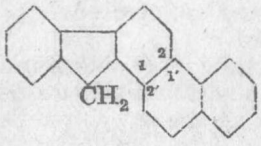

$C_{13}H_8O_2$ MW, 196

Pale yellow needles from EtOH. M.p. 141–2° (138°). Sol. $Me_2CO$, $CHCl_3$, $C_6H_6$, AcOH. Spar. sol. $Et_2O$. Insol. $H_2O$. Greenish-yellow sol. in conc. $H_2SO_4$ ⟶ blue fluor.

Dey, Rao, Sankaranarayanan, *J. Indian Chem. Soc.*, 1932, **9**, 71.
Bezdzik, Friedländer, *Monatsh.*, 1909, **30**, 280.
See also previous reference.

**Naphthacridine.**
*See* Chrysidine.

**2′ : 1′-Naphtha-1 : 2-fluorene**

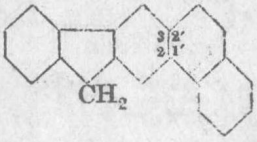



$C_{21}H_{14}$ MW, 266

Colourless leaflets from xylene. M.p. 327–8°. Forms add. comp., m.p. 249–51°, with 2 : 7-dinitroanthraquinone.

Cook *et al.*, *J. Chem. Soc.*, 1934, 1737.

**1′ : 2′-Naphtha-2 : 3-fluorene**




$C_{21}H_{14}$ MW, 266

Colourless leaflets from $C_6H_6$–EtOH. M.p. 226°.

Cook *et al.*, *J. Chem. Soc.*, 1935, 1323.

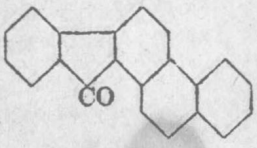
**2′ : 3′-Naphtha-2 : 3-fluorene** (lin-*Naphthafluorene*)


$C_{21}H_{14}$ MW, 266

Cryst. from toluene. M.p. 317°. Sol. $C_6H_6$ ⟶ bright blue fluor. Sol. conc. $H_2SO_4$ ⟶ bright green fluor.

Barnett, Goodway, Watson, *Ber.*, 1933, **66**, 1890.

**2′ : 1′-Naphtha-1 : 2-fluorenone**

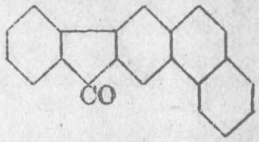



$C_{21}H_{12}O$ MW, 280

Reddish-orange needles from AcOH. M.p. 207–8°.

Cook *et al.*, *J. Chem. Soc.*, 1934, 1737.

**1′ : 2′-Naphtha-2 : 3-fluorenone**

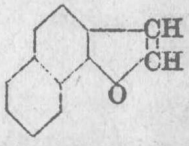



$C_{21}H_{12}O$ MW, 280

Reddish-brown needles. M.p. 215°. Sol. in conc. $H_2SO_4$ ⟶ magenta col.

Cook *et al.*, *J. Chem. Soc.*, 1935, 1323.

**α-Naphthafuran** (6 : 7-*Benzcoumarone*)



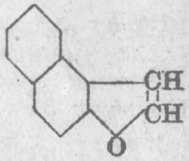

$C_{12}H_8O$ MW, 168

Pale yellow oil. M.p. — 7°. B.p. 282–4°/755 mm. $D^{14}$ 1·1504. $n_D^{16}$ 1·634. Sol. conc. $H_2SO_4$ ⟶ yellowish-green col., on warming ⟶ blue ⟶ violet fluor.

*Picrate* : reddish-yellow needles. M.p. 113°.

Stoermer, *Ann.*, 1900, 312, 310.
Boes, *Chem. Zentr.*, 1902, I, 1356.

**β-Naphthafuran** (4 : 5-*Benzcoumarone*)



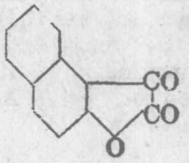

$C_{12}H_8O$ MW, 168

Needles. M.p. 60–1° (65°). B.p. 284–6° (280°). Sol. conc. $H_2SO_4$ ⟶ yellowish-green col., on warming ⟶ pale violet ⟶ dirty bluish-green ⟶ brownish-violet fluor.

*Picrate* : red needles. M.p. 141°.

See previous references.

**β-Naphthafurandione** (4 : 5-*Benzcoumarandione*)




$C_{12}H_6O_3$ MW, 198

Orange-yellow needles from AcOH or $C_6H_6$.

版，需要完整请访问：www.ertongbook.com

M.p. 182° decomp. Sol. EtOH. Spar. sol. $H_2O$, pet. ether. The blood-red sol. in conc. $H_2SO_4$ turns colourless on warming.

2-*Anil* : m.p. 126–7°.

2 : 3-*Phenazine* : m.p. 286–7°.

3-*Phenylhydrazone* : m.p. 226–7°.

3-*Semicarbazone* : m.p. 240–1°.

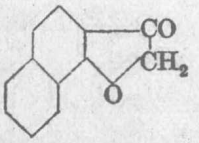
*Picrate* : m.p. 109°.

Giua, Franciscis, *Gazz. chim. ital.*, 1924, **54**, 509.

Passerini, *ibid.*, 184.

Staudinger, Swiss Ps., 92,688, 93,486, (*Chem. Abstracts*, 1924, **18**, 989).

**α-Naphthafuranone-3** (6 : 7-*Benzcoumaranone*-3)



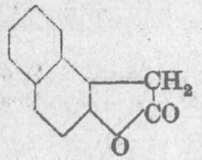
$C_{12}H_8O_2$ MW, 184

Pale yellow needles. M.p. 119°. Yellow sol. in conc. $H_2SO_4$ ⟶ green fluor. Fehling's ⟶ deep purple col.

2-*Benzylidene deriv.* : m.p. 130°.

Ingham, Stephen, Timpe, *J. Chem. Soc.*, 1931, 895.

**β-Naphthafuranone-2** (2-*Hydroxy*-1-*naphthylacetic lactone*, 4 : 5-*benzisocoumaranone*)



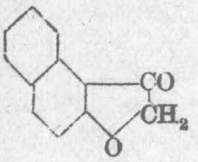
$C_{12}H_8O_2$ MW, 184

Leaflets. M.p. 107° (104°). Very spar. sol. $H_2O$. Sol. conc. $H_2SO_4$ ⟶ green fluor.

I.G., D.R.P., 562,391; E.P., 330,916, (*Chem. Abstracts*, 1933, **27**, 735; 1930, **24**, 6031).

Mayer, Schäfer, Rosenbach, *Chem. Zentr.*, 1929, II, 3009.

**β-Naphthafuranone-3** (4 : 5-*Benzcoumaranone*)



$C_{12}H_8O_2$ MW, 184

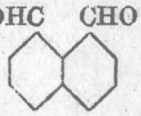
Colourless needles from pet. ether, EtOH, or AcOH. M.p. 133°. Sol. $Et_2O$, $C_6H_6$. Sol. conc. $H_2SO_4$ with pale yellow col. Sol. alc. NaOH with bluish-red col. $HNO_3$ ⟶ 2-nitro-deriv., m.p. 190° decomp.

2-p-*Nitrobenzylidene deriv.* : m.p. 270°.

Dziewonski, Duzyk, *Chem. Abstracts*, 1934, **28**, 4415.

Fries, Frellstedt, *Ber.*, 1921, **54**, 715.

**Naphthalaldehyde** (*Naphthalene* 1 : 8-*dialdehyde*, 1 : 8-*dialdehydonaphthalene*)



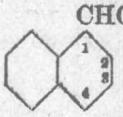
$C_{12}H_8O_2$ MW, 184

*Hydrate* : $C_{12}H_8O_2,H_2O$. Colourless needles from $C_6H_6$. M.p. 130° Reduces $NH_3.AgNO_3$.

*Di*-p-*nitrophenylhydrazone* : reddish needles. M.p. 229°.

Criegee, Kraft, Rank, *Ann.*, 1933, **507**. 194.

**1-Naphthaldehyde** (*Naphthalene α-aldehyde*)



$C_{11}H_8O$ MW, 156

M.p. 33–4°. B.p. 292°, 156°/19 mm., 150°/9 mm. Forms bisulphite comp. Ox. in air ⟶ 1-naphthoic acid.

*Anil* : m.p. 71°.

*Azine* : m.p. 152°.

*Oxime* : m.p. 98° (39°).

*Phenylhydrazone* : m.p. 80°.

p-*Nitrophenylhydrazone* : m.p. 234°.

*Semicarbazone* : m.p. 221°.

*Picrate* : m.p. 94°.

Shoppee, *J. Chem. Soc.*, 1933, 42.

Wuyts *et al.*, *Bull. soc. chim. Belg.*, 1932, **41**, 196; 1931, **40**, 665.

I.G., E.P., 250,955, (*Chem. Abstracts*, 1927, **21**, 1272).

Stephen, *J. Chem. Soc.*, 1925, **127**, 1877.

Weil, Ostermeier, *Ber.*, 1921, **54**, 3217.

Gattermann, *Ann.*, 1912, **393**, 227.

**2-Naphthaldehyde** (*Naphthalene β-aldehyde*).

Leaflets from boiling $H_2O$. M.p. 61° (59°). Sol. EtOH, $Et_2O$. Volatile in steam. Gives bisulphite comp. $KMnO_4$ ⟶ 2-naphthoic acid.

*Anil* : m.p. 113°.

*Azine* : m.p. 232°.

*Phenylhydrazone* : m.p. 217–18° (205–6°).

*p-Nitrophenylhydrazone* : m.p. 230°.
*Semicarbazone* : m.p. 245°.

See first two and last two references above.

**Naphthaldehyde-carboxylic Acid.**
*See* Naphthaldehydic Acid.

**1 : 2-Naphthaldehydic Acid** (*2-Formyl-1-naphthoic acid, naphthalene-2-aldehyde-1-carboxylic acid, 2-aldehydo-1-naphthoic acid, 2-naphthaldehyde-1-carboxylic acid*)


$C_{12}H_8O_3$ MW, 200

M.p. 176°.
*Oxime* : m.p. 215°.

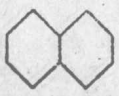
Mayer, Schäfer, Rosenbach, *Chem. Abstracts*, 1930, **24**, 839.

**1 : 8-Naphthaldehydic Acid** (*8-Formyl-1-naphthoic acid, naphthalene-8-aldehyde-1-carboxylic acid, 8-aldehydo-1-naphthoic acid, 1-naphthaldehyde-8-carboxylic acid*).

Leaflets from EtOH.Aq. M.p. 167–8° decomp. (rapid heat.).
*Me ester* : $C_{12}H_{10}O_3$. MW, 214. Rhombic cryst. M.p. 105°. Mod. sol. hot $H_2O$. Sol. EtOH, $Et_2O$, $C_6H_6$.
*Acetyl deriv. of lactone form* : $C_{14}H_{10}O_4$. MW, 242. M.p. 140°.

Graebe, Gfeller, *Ann.*, 1893, **276**, 13.
Zink, *Monatsh.*, 1901, **22**, 988.
Winterstein, Maxim, *Helv. Chim. Acta*, 1919, **2**, 202.

**Naphthalene**



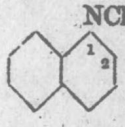
$C_{10}H_8$ MW, 128

Colourless plates from EtOH. M.p. 80·3°. B.p. 218°. Sublimes at 50°/760 mm., 22°/7 mm. Volatile in steam. $D^{19}$ 1·1517, $D_4^{100}$ 0·9625. $n_D^{99}$ 1·58232. Heat of comb. $C_p$ and $C_v$ 1242 Cal. (9605 cal./gm.). Very sol. $Et_2O$, $C_6H_6$, toluene, xylene, chlorobenzene, tetralin, hot EtOH, $CHCl_3$. Mod. sol. MeOH, cold EtOH. Spar. sol. cold pet. ether. Insol. $H_2O$. Forms add. comps. with 1 : 3-dinitrobenzene, m.p. 52°; 2 : 4-dinitrophenol, m.p. 95°; 2 : 4-dinitrotoluene, m.p. 61°; 2 : 4 : 6-trinitrotoluene, m.p. 97°. Passed through red-hot tube ⟶ 2 : 2′-dinaphthyl. $H_2SO_4$ + $HgSO_4$, or air + (vanadium comps.) ⟶ phthalic acid. $KMnO_4$.Aq. ⟶ phthalonic acid. $HNO_3$ or $CrO_3$.Aq. ⟶ phthalic acid. $CrO_3$ + AcOH ⟶ 1 : 4-naphthoquinone + phthalic acid.
*Picrate* : m.p. 149·5°.
*Styphnate* : m.p. 168–9°.

Ward, *J. Phys. Chem.*, 1934, **38**, 761.
Hill. U.S.P., 1,819,680, (*Chem. Abstracts*, 1931, **25**, 5759).
Schroeter, U.S.P., 1,763,410, (*Chem. Abstracts*, 1930, **24**, 3803).
Salont, *Dyer, and Calico Printer*, 1928, **60**. 208 (*Review*).
Weissenberger, *Z. angew. Chem.*, 1927, **40**, 776.
Veselý, Jakes, *Bull. soc. chim.*, 1923, **33**, 955.
Davy, *Chem. Abstracts*, 1920, **14**, 618.
Bamberger, *Ber.*, 1913, **46**, 1899 (*Bibl.*).

**Naphthalene 1 : 8-Dialdehyde.**
*See* Naphthalaldehyde.

**Naphthalene-1-diazonium chloride** (*α-Diazonaphthalene chloride*)




$C_{10}H_7N_2Cl$ MW, 190·5

Pale yellow needles. M.p. 96° decomp. Sol. $H_2O$, AcOH, MeOH. Spar. sol. EtOH, $Me_2CO$. Insol. $Et_2O$, $C_6H_6$, $CS_2$, ligroin. Forms stable comp. with $ZnCl_2$.

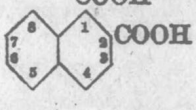
Baudisch, Fürst, *Ber.*, 1912, **45**, 3428.
Badische, E.P., 238,676, (*Chem. Abstracts*, 1926, **20**, 1996).

**Naphthalene-2-diazonium chloride** (*β-Diazonaphthalene chloride*).

Yellow needles. Explodes on heating. Sol. $H_2O$. Insol. $Et_2O$, $C_6H_6$, $CS_2$. Forms stable comp. with $ZnCl_2$.

Knoevenagel, *Ber.*, 1895, **28**, 2052, 2057.
See also second reference above.

**Naphthalene-1 : 2-dicarboxylic Acid**




$C_{12}H_8O_4$ MW, 216

Cryst. from $H_2O$. M.p. 175° ⟶ anhydride. Sol. EtOH, $Et_2O$, AcOH. Spar. sol. $C_6H_6$, ligroin, $CHCl_3$, $CS_2$.
*Di-Me ester* : $C_{14}H_{12}O_4$. MW, 244. Cryst. from MeOH. M.p. 80°. Spar. sol. pet. ether.

*Diamide*: $C_{12}H_{10}O_2N_2$. MW, 214. Plates. M.p. 265° ⟶ imide.

*Dinitrile*: 1 : 2-dicyanonaphthalene. $C_{12}H_6N_2$. MW, 178. Needles from $C_6H_6$. M.p. 190°. Sublimes. Spar. sol. EtOH.

*Anhydride*: $C_{12}H_6O_3$. MW, 198. Needles from EtOH. M.p. 168–9°. Sublimes. Sol. $Et_2O$.

*Imide*: $C_{12}H_7O_2N$. MW, 197. M.p. 224°.

Waldmann, Weiss, *J. prakt. Chem.*, 1930, **127**, 195.

Noto, *Gazz. chim. ital.*, 1915, **45**, ii, 126, 427.

Freund, Fleischer, *Ann.*, 1913, **399**, 212.

**Naphthalene-1 : 4-dicarboxylic Acid.**

Rodlets from AcOH. M.p. 309° (288°). Sol. EtOH ⟶ blue fluor. Insol. boiling $H_2O$.

*Di-Me ester*: cryst. from AcOH. M.p. 64°. B.p. 195–7°/12 mm.

*Dichloride*: $C_{12}H_6O_2Cl_2$. MW, 253. Needles from pet. ether. M.p. 80°.

*Dinitrile*: 1 : 4-dicyanonaphthalene. Needles from AcOH. M.p. 206°. Spar. sol. EtOH, $Et_2O$.

I.G., D.R.P., 558,471, (*Chem. Abstracts*, 1933, **27**, 310).

Mayer *et al.*, *Ber.*, 1922, **55**, 1841.

Scholl, Neumann, *ibid.*, 120.

**Naphthalene-1 : 5-dicarboxylic Acid.**

Colourless needles from $PhNO_2$. M.p. 315–20° decomp. Insol. ord. solvents.

*Di-Me ester*: leaflets from MeOH. M.p. 114–15°.

*Di-Et ester*: $C_{16}H_{16}O_4$. MW, 272. Needles. M.p. 123–4°.

*Diphenyl ester*: $C_{24}H_{16}O_4$. MW, 368. Cryst. from $C_6H_6$. M.p. 198–9°.

*Dichloride*: needles from $CHCl_3$. M.p. 155–6°.

*Dinitrile*: 1 : 5-dicyanonaphthalene. Needles from EtOH. M.p. 260° (267°). Sublimes.

Salkind, *Ber.*, 1934, **67**, 1031.

See also third reference above.

**Naphthalene-1 : 6-dicarboxylic Acid.**

Needles from AcOH. M.p. 310°. Sol. hot EtOH, hot AcOH.

*Di-Me ester*: needles from EtOH M.p. 99°.

*Dinitrile*: 1 : 6-dicyanonaphthalene. Needles from EtOH. M.p. 208–10°.

Weissgerber, Kruber, *Ber.*, 1919, **52**, 354.

**Naphthalene-1 : 7-dicarboxylic Acid.**

Micro-cryst. powder from EtOH.Aq. M.p. 294–6° decomp. Sol. ord. org. solvents.

*Di-Me ester*: cryst. from EtOH. M.p. 86–7°.

Ruzicka, Melsen, *Helv. Chim. Acta*, 1931, **14**, 397.

**Naphthalene-1 : 8-dicarboxylic Acid.**

*See* Naphthalic Acid.

**Naphthalene-2 : 3-dicarboxylic Acid.**

Prisms from AcOH. M.p. 239–41° (246° after sublimation). Sol. hot EtOH. Spar. sol. $Et_2O$, hot AcOH. Very spar. sol. ligroin, $CHCl_3$, $C_6H_6$, $CS_2$, cold $H_2O$. Heat + aniline ⟶ phenylimide. $SOCl_2$ or $PCl_5$ ⟶ anhydride. The $NH_4$ salt at 270° ⟶ imide.

*Anhydride*: rectangular plates from AcOH. M.p. 246°.

*Mono-nitrile*: 3-cyano-2-naphthoic acid. $C_{12}H_7O_2N$. MW, 197. Yellow cryst. M.p. 273–4°.

*Imide*: micro-needles from $CHCl_3$–EtOH. M.p. 275° (softens at 250°).

*Phenylimide*: $C_{18}H_{11}O_2N$. MW, 273. Rectangular silvery plates from $CHCl_3$–EtOH. M.p. 277–8°.

Waldmann, Mathiowetz, *Ber.*, 1931, **64**, 1713.

I.G., F.P., 682,474, (*Chem. Abstracts*, 1930, **24**, 4306).

Freund, Fleischer, *Ann.*, 1913, **402**, 68.

**Naphthalene-2 : 6-dicarboxylic Acid.**

Needles from EtOH.Aq. M.p. above 300° decomp. Insol. boiling $C_6H_6$, toluene, AcOH.

*Di-Me ester*: cryst. from MeOH. M.p. 191°. Sol. $Et_2O$, $CHCl_3$, toluene, hot ligroin. Spar. sol. pet. ether.

*Mono-nitrile*: 6-cyano-2-naphthoic acid. M.p. above 300° decomp. Very spar. sol. org. solvents.

*Dinitrile*: 2 : 6-dicyanonaphthalene. Needles from AcOH. M.p. 296–7°. Insol. boiling EtOH, $Et_2O$, $C_6H_6$.

*Dianilide*: leaflets from aniline. Does not melt below 320°.

Kaufler, Thien, *Ber.*, 1907, **40**, 3257.

**Naphthalene-2 : 7-dicarboxylic Acid.**

Needles from EtOH. M.p. above 300° decomp. Very spar. sol. boiling $C_6H_6$, toluene, AcOH.

*Di-Me ester*: cryst. from MeOH. M.p. 135–6° (141°). Sol. hot ligroin. Spar. sol. pet. ether.

*Di-Et ester*: m.p. 238°.

*Diphenyl ester*: $C_{24}H_{16}O_4$. MW, 368. M.p. 162°.

*Mono-nitrile*: 7-cyano-2-naphthoic acid. M.p. above 300° decomp.

*Dinitrile*: 2 : 7-dicyanonaphthalene. Needles from AcOH. M.p. 267–8°. Sol. hot EtOH.

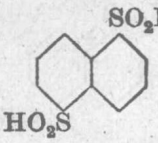
*Dianilide*: scales from aniline. M.p. 297–8°.

Purgotti, *Chem. Abstracts*, 1926, **20**, 1618.

See also previous reference.

**Naphthalene-dihydride.**
*See* Dihydronaphthalene.

**Naphthalene-1 : 5-disulphinic Acid**



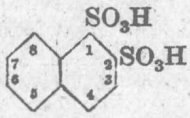
$C_{10}H_8O_4S_2$ MW, 256

Glittering leaflets from HCl.Aq. M.p. 166–7° (174–5° decomp.). Sol. hot $H_2O$, hot EtOH. Spar. sol. $Et_2O$, cold EtOH, cold $H_2O$. Reduces cold alk. $KMnO_4$. Reacts with *p*-benzoquinone (2 mols.) ⟶ comp., m.p. 294°.

*Di-$NH_4$ salt* : prisms from EtOH. M.p. 194°.

Curtius, Tüxen, *J. prakt. Chem.*, 1930, **125**, 406.
Corbellini, Albenga, *Gazz. chim. ital.*, 1931, **61**, 111.

**Naphthalene-1 : 2-disulphonic Acid**



$C_{10}H_8O_6S_2$ MW, 288

*Anhydride* : $C_{10}H_6O_5S_2$. MW, 270. M.p. 198–9°.

Gattermann, *Ber.*, 1899, **32**, 1156.

**Naphthalene-1 : 3-disulphonic Acid.**
*Dichloride* : $C_{10}H_6O_4Cl_2S_2$. MW, 325. Prisms from $C_6H_6$. M.p. 138°.

Dressel, Kothe, *Ber.*, 1894, **27**, 1197.
Armstrong, Wynne, *Chem. News*, 1890, **62**, 163.

**Naphthalene-1 : 4-disulphonic Acid.**
*Dichloride* : plates. M.p. 160°. Sol. $C_6H_6$.
*Diamide* : $C_{10}H_{10}O_4N_2S_2$. MW, 286. Needles from EtOH.Aq. M.p. 273°.
*Dianilide* : pearly leaflets. M.p. 179°.

Gattermann, *Ber.*, 1899, **32**, 1156.

**Naphthalene-1 : 5-disulphonic Acid** ("γ-" *Naphthalenedisulphonic acid*).
Plates + $4H_2O$ from HCl.Aq. M.p. anhyd. 240–5°. Sol. 0·98 part $H_2O$ at 20°. Aq. sol. tastes bitter-astringent. Forms series of arylamine salts of definite m.ps.
*Di-Me ester* : $C_{12}H_{12}O_6S_2$. MW, 316. Cryst. from $CHCl_3$. M.p. 205°.
*Mono-Et ester* : $C_{12}H_{12}O_6S_2$. MW, 316. Cryst. from EtOH. M.p. 147°.
*Difluoride* : $C_{10}H_6O_4F_2S_2$. MW, 292. M.p. 203°.
*Dichloride* : prisms from $C_6H_6$. M.p. 183°.
*Diamide* : does not melt below 340°.
*Dianilide* : m.p. 248–9°.
*Diazide* : $C_{10}H_6O_4N_6S_2$. MW, 338. Cryst. from AcOH or $CHCl_3$. M.p. 177°.
*Dihydrazide* : $C_{10}H_{12}O_4N_6S_2$. MW, 316. Microneedles from $H_2O$. Does not melt (blackens at 240°).
*Benzyl-ψ-thiourea salt* : m.p. 251° decomp.

Corbellini, Albenga, *Gazz. chim. ital.*, 1931, **61**, 111.
Curtius, Tüxen, *J. prakt. Chem.*, 1930, **125**, 401.
Steinkopf *et al.*, *ibid.*, 1927, **117**, 1.
Lynch, Scanlan, *Ind. Eng. Chem.*, 1927, **19**, 1010.
Fierz-David, Hasler, *Helv. Chim. Acta*, 1923, **6**, 1133.
Forster, Hishiyama, *J. Soc. Chem. Ind.*, 1932, **51**, 297T.
Hann, Keenan, *J. Phys. Chem.*, 1927, **31**, 1086.

**Naphthalene-1 : 6-disulphonic Acid** ("δ"- *Naphthalenedisulphonic acid*).
Prisms + $4H_2O$ from $H_2O$. M.p. anhyd. 125° decomp. Sol. 0·61 part $H_2O$ at 18–20°. Forms α-naphthylamine salt, m.p. 265–7° decomp.
*Dichloride* : leaflets from $C_6H_6$. M.p. 129°. Very sol. $C_6H_6$.
*Diamide* : m.p. 297–8°.
*Benzyl-ψ-thiourea salt* : decomp. at 81°.

Ufimzew, Kriwoschlükowa, *J. prakt. Chem.*, 1934, **140**, 172.
Ambler, *Ind. Eng. Chem.*, 1927, **19**, 417; 1920, **12**, 1080.
See also last three references above.

**Naphthalene-1 : 7-disulphonic Acid.**
*Dichloride* : prisms from $C_6H_6$. M.p. 123°. Sol. 7% in $C_6H_6$.

See first reference above.

**Naphthalene-1 : 8-disulphonic Acid.**
*Anhydride* : plates. M.p. 227°. Sol. hot AcOH, hot xylene. Spar. sol. $C_6H_6$.

Armstrong, Wynne, *Chem. News*, 1893, **67**, 299.

**Naphthalene-2 : 6-disulphonic Acid** ("β"- *Naphthalenedisulphonic acid*).
Leaflets. Deliquesces very slowly in air. Forms series of arylamine salts of definite m.ps.
*Dichloride* : flat needles. M.p. 225°. Spar. sol. $C_6H_6$. Insol. $Et_2O$.

*Benzyl-ψ-thiourea salt*: m.p. 256°.

Hann, Keenan, *J. Phys. Chem.*, 1927, **31**, 1086.
Heid, *J. Am. Chem. Soc.*, 1927, **49**, 844.
Forster, Keyworth, *J. Soc. Chem. Ind.*, 1924, **43**, 165T.
Fierz-David, Hasler, *Helv. Chim. Acta*, 1923, **6**, 1133.
Armstrong, Wynne, *Chem. News*, 1890, **62**, 163.

**Naphthalene-2:7-disulphonic Acid** ("α"-*Naphthalenedisulphonic acid*).

Very hygroscopic needles. Spar. sol. cold conc. HCl. Forms series of arylamine salts of definite m.ps.

*Dichloride*: four-sided plates from $C_6H_6$. M.p. 159°. Mod. sol. $Et_2O$.

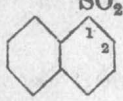
*Dibromide*: $C_{10}H_6O_4Br_2S_2$. MW, 414. Prisms from $C_6H_6$. M.p. 137°.

*Diamide*: needles. M.p. 242–3°.

*Benzyl-ψ-thiourea salt*: m.p. 211–12° decomp.

Ufimzew, Kriwoschlükowa, *J. prakt. Chem.*, 1934, **140**, 172.
Ambler, *Ind. Eng. Chem.*, 1920, **12**, 1194.
See also first four references above.

**Naphthalene-1-sulphinic Acid** (α-*Naphthalenesulphinic acid*)




$C_{10}H_8O_2S$ MW, 192

Needles from $H_2O$. M.p. 98–9° (84–5°). Sol. $H_2O$. Mod. sol. EtOH. Spar. sol. HCl.Aq., $Et_2O$. Dil. HCl at 180° ⟶ naphthalene + $SO_2$.

Höchst, D.R.P., 224,019, (*Chem. Zentr.*, 1910, II, 513).
Knoevenagel, Kenner, *Ber.*, 1908, **41**, 3319.
Rosenheim, Singer, *Ber.*, 1904, **37**, 2154.
Otto, Rössing, Troeger, *J. prakt. Chem.*, 1893, **47**, 95.
Thomas, *J. Chem. Soc.*, 1909, **95**, 342.

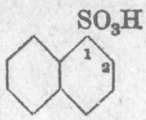
**Naphthalene-2-sulphinic Acid** (β-*Naphthalenesulphinic acid*).

Needles from $H_2O$. M.p. 105°. Sol. $H_2O$, EtOH, $Et_2O$. Sol. in conc. $H_2SO_4$ gradually turns green. Dil. HCl at 150° ⟶ naphthalene + $SO_2$.

*Me ester*: $C_{11}H_{10}O_2S$. MW, 206. Leaflets from pet. ether. M.p. 44°. Sol. ord. org. solvents. Decomp. on standing. Hyd. by $H_2O$.

See last two references above.

**Naphthalene-1-sulphonic Acid** (*Naphthalene-α-sulphonic acid*)




$C_{10}H_8O_3S$ MW, 208

Prisms + $2H_2O$ from HCl.Aq. M.p. 90°. Sol. $H_2O$, EtOH. Spar. sol. $Et_2O$. $k = 0{\cdot}18 \times 10^{-3}$ at 25°. Forms series of arylamine salts of definite m.ps. Acid $KMnO_4$ ⟶ phthalic acid.

*Me ester*: $C_{11}H_{10}O_3S$. MW, 222. M.p. 78° (72–3°). B.p. 214°/15 mm.

*Et ester*: $C_{12}H_{12}O_3S$. MW, 236. Liq. Decomp. on dist.

*Phenyl ester*: $C_{16}H_{12}O_3S$. MW, 284. M.p. 75°.

*Fluoride*: $C_{10}H_7O_2FS$. MW, 210. M.p. 56°.

*Chloride*: $C_{10}H_7O_2ClS$. MW, 226·5. Leaflets from $Et_2O$. M.p. 68°. B.p. 194–5°/13 mm., 147·5°/0·9 mm.

*Bromide*: $C_{10}H_7O_2BrS$. MW, 271. M.p. 88–9°.

*Amide*: $C_{10}H_9O_2NS$. MW, 207. M.p. 150°.

*Anilide*: m.p. 152°.

*Azide*: cryst. from EtOH. M.p. 53°, decomp. at 133°.

*Hydrazide*: needles from EtOH.Aq. M.p. 123° decomp. *HCl salt*: m.p. 142°.

*Piperidide*: m.p. 133–4°.

*Benzyl-ψ-thiourea salt*: m.p. 138°.

2-*Naphthylamine salt*: m.p. 276–9° decomp.

Geigy F.P., 765,771, (*Chem. Abstracts*, 1934, **28**, 6726).
Cumming, Muir, *Chem. Abstracts*, 1934, **28**, 4409.
Masters, U.S.P., 1,922,813, (*Chem Abstracts*, 1933, **27**, 5085).
Radcliffe, Short, *J. Chem. Soc.* 1931, 220.
Curtius, Bottler, Hasse, *J. prakt. Chem.*, 1930, **125**, 366.
Fierz-David, Weissenbach, *Helv. Chim. Acta*, 1920, **3**, 310, 315.
Rodionow, *Bull. soc. chim.*, 1929, **45**, 117.
Hann, Keenan, *J. Phys. Chem.*, 1927, **31**, 1084.
Forster, Keyworth, *J. Soc. Chem. Ind.*, 1924, **43**, 299T.

**Naphthalene-2-sulphonic Acid** (*Naphthalene-β-sulphonic acid*).

Very hygroscopic cryst. M.p. 91°. On standing in air, or cryst. from HCl.Aq. ⟶ trihydrate, m.p. 83°. Kept over $CaCl_2$ or conc. $H_2SO_4$ ⟶ monohydrate, m.p. 124°. $k = 0{\cdot}25 \times 10^{-3}$ at 25°. Very sol. ord. org. solvents. Forms series of arylamine salts of definite m.ps.

**Naphthalene-1 : 4 : 5 : 8-tetracarboxylic Acid**

With 1 mol. glycine ⟶ cryst. comp., m.p. 193°. Neutral or acid $KMnO_4$ ⟶ phthalic acid.

*Me ester*: m.p. 56°. B.p. 224–5°/15 mm.

*Et ester*: m.p. 11–12°. B.p. 134°/vac. of cathode light.

*Phenyl ester*: m.p. 98–9°.

*Fluoride*: m.p. 87–8°.

*Chloride*: m.p. 79° (66°). B.p. 201°/13 mm., 148°/0·6 mm.

*Bromide*: m.p. 96–7°.

*Amide*: m.p. 217° (212°).

*Azide*: needles from ligroin. M.p. 44–6° slight decomp.

*Hydrazide*: m.p. 137–9°. *HCl salt*: m.p. 148–50°.

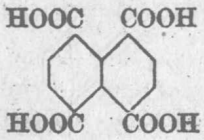
*Disulphonimide*: $(C_{10}H_7SO_2)_2NH$. Cryst. from $C_6H_6$. M.p. 180–1°. Sol. $H_2O$.

*Benzyl-ψ-thiourea salt*: m.p. 193°.

*2-Naphthylamine salt*: m.p. 211° (brown at 202°).

I.G., D.R.P., 574,836; E.P., 384,722, (*Chem. Abstracts*, 1933, 27, 4543, 4251).
Dennis, U.S.P., 1,332,203, (*Chem. Abstracts*, 1920, 14, 1123).
See also last three references above.

**Naphthalene-1 : 4 : 5 : 8-tetracarboxylic Acid**




$C_{14}H_8O_8$ MW, 304

Leaflets or needles from HCl.Aq. No characteristic m.p. Rapid heat at 200–50° ⟶ decomp., slow heat at 140–50° or cryst. from AcOH ⟶ anhydride. Sol. $Me_2CO$.Aq. Mod. sol. $H_2O$, hot AcOH. Very spar. sol. $C_6H_6$, $CHCl_3$, $CS_2$, EtOH.

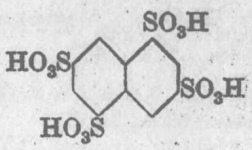
*Di-anhydride* $C_{14}H_4O_6$. MW, 268. Needles from AcOH. Sublimes above 300°. Heat + $NH_3$ ⟶ di-imide.

*Di-imide*: $C_{14}H_6O_4N_2$. MW, 266. Yellowish needles from $H_2O$. Sublimes above 270°. Very spar. sol. ord. org. solvents.

Greune, Eckert, U.S.P., 1,970,651, (*Chem. Abstracts*, 1934, 28, 6159).
I.G., D.R.P., 601,104; F.P., 756,156, (*Chem. Abstracts*, 1934, 28, 7267, 2018). F.P., 721,339, (*Chem. Abstracts*, 1932, 26, 4184). E.P., 364,116, (*Chem. Abstracts*, 1933, 27, 2457). E.P., 363,044, (*Chem. Abstracts*, 1933, 27, 1642).
Freund, Fleischer, *Ann.*, 1913, 402, 74.
Bamberger, Philip, *Ann.*, 1887, 240, 182.

**Naphthalene-1 : 3 : 5-trisulphonic Acid**

**Naphthalene-1 : 3 : 5 : 7-tetrasulphonic Acid**



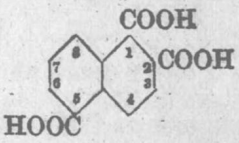

$C_{10}H_8O_{12}S_4$ MW, 448

*Ba salt*: $C_{10}H_4(SO_3)_4Ba_2$. Dimorphous. Blunt prisms + $14H_2O$ at 15° (efflorescent). Cryst. + $8H_2O$ at 35° (stable in air).

*Tetrachloride*: $C_{10}H_4O_8Cl_4S_4$. MW, 522. Tetrahedral cryst. M.p. 261–2°. Spar. sol. $C_6H_6$, $Me_2CO$.

Schmid, *Chem. Abstracts*, 1922, 16, 2141.
Fierz-David, *J. Soc. Chem. Ind.*, 1923, 42, 421T.
Cf. Ufimzew, Kriwoschlükowa, *J. prakt. Chem.*, 1934, 140, 172.

**Naphthalene-1 : 2 : 5-tricarboxylic Acid**




$C_{13}H_8O_6$ MW, 260

Colourless feathery needles. M.p. (vac. sublimed) 270–2°. Sol. MeOH.

*Tri-Me ester*: $C_{16}H_{14}O_6$. MW, 302. Cryst. M.p. 91–2°.

Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 2546.
Ruzicka, Hosking, *Helv. Chim. Acta*, 1930, 13, 1405, 1411.

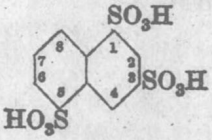
**Naphthalene-1 : 4 : 5-tricarboxylic Acid.** Cryst. from conc. HCl. Does not melt, but at 100–20° forms the anhydride.

*Anhydride*: $C_{13}H_6O_5$. MW, 242. Cryst. from EtOH.Aq. M.p. 274° (243°).

*Anhydride Me ester*: $C_{14}H_8O_5$. MW, 256. Needles from AcOH. M.p. 222°.

Fieser Peters, *J. Am. Chem. Soc.*, 1932, 54, 4352.
Graebe, Haas, *Ann.*, 1903, 327, 95.

**Naphthalene-1 : 3 : 5-trisulphonic Acid**




$C_{10}H_8O_9S_3$ MW, 368

Amorph. mass. Readily takes up $H_2O$ ⟶

此为试读，需要完整PDF请访问：www.ertongbook.com