

ELSEVIER'S ENCYCLOPÆDIA *of* ORGANIC CHEMISTRY

Edited by F. RADT

Series III

CARBOISOCYCLIC CONDENSED COMPOUNDS

Volume 12 B

NAPHTHALENE

A. Compounds Containing One Naphthalene Nucleus

Pages 345—1052

Nitrogen Compounds

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*In this volume the literature has been
consulted up to and including 1944, the literature concerning the structure
of compounds up to 1949*

PREFACE TO VOLUME 12

Bicyclic carboisocyclic compounds are dealt with in Volume 12. Owing to the enormous number of compounds with the naphthalene skeleton, the volume is divided into two parts: Vol. 12A includes all bicyclic compounds except those with the naphthalene skeleton, which are contained in Vol. 12B.

Because of post-war difficulties concerning the availability of many original papers, the literature for Vol. 12A could only be compiled up to and including 1941. For Vol. 12B, the first part of which will appear in 1948, the closing date for the inclusion of references is the 31st December 1944. In all cases, publications relating to the structure of compounds are considered right up to the date of printing.

Amsterdam, December, 1947

F. RADT

FROM THE PREFACE TO VOLUME 13

The present volume was almost ready for the press when further work was rendered difficult, if not impossible, by the war and the German occupation of Holland. Before all else, we must place on record here the fate of one of the founders of the Encyclopaedia, Dr. EDITH JOSEPHY, whose faithful devotion to this publication has ended fatally; seized by the Nazis and deported, she shared the fate of the thousands who never returned. The loss of her untiring energy, her vast experience, and her organizing ability could only gradually be compensated for by obtaining new collaborators and by increased efforts of the total editorial staff.

Amsterdam, December, 1946

F. RADT

FROM THE PREFACE TO VOLUME 14

The enormous and increasing output of chemical literature makes it desirable to have a comprehensive account of all the facts known in the field of organic chemistry up to the present, elaborated in such a way that completeness is assured, erroneous data are excluded, and the facts coordinated in a clear and critical way.

The development of our knowledge of the various branches of natural science during the last few decades has taken organic chemistry out of its isolated position and has emphasized the close relationship of organic chemistry particularly to physics and biology.

Organic chemistry has become a sphere of interest not only for those working in pure and applied chemistry but also for physicists and biologists who need the organic compounds for their investigations.

Appreciative of these facts, the Editors planned to arrange the Encyclopaedia of Organic Chemistry as a complete survey of all the organic compounds including not only purely chemical but also physical and physiological data.

Bearing in mind that the value of the Encyclopaedia to workers in various branches of science will depend largely on the simplicity of the system employed for the arrangement of the compounds, it was decided to use a system based on the structure of the compounds so that compounds which are most closely related are placed together. Within each of the three series (aliphatic, carbocyclic, and heterocyclic) the structural skeleton determines the arrangement. The carbocyclic compounds are divided into compounds with non-condensed and such with condensed rings; the first group is further subdivided according to the number of carbon atoms forming the ring; e.g., compounds with cyclopropane, cyclobutane, cyclo-

pentane, benzene rings, etc. For the condensed polycyclic compounds the natural division is given by the number of the condensed rings leading to classification as bicyclic, tricyclic compounds, etc. In each group with the same number of condensed rings, the compounds with the smallest ring are placed first. In this way the whole chemistry of all the compounds with, for instance, a naphthalene skeleton is to be found in one section. This enables the user to find any compound with the minimum of trouble, especially as the compounds within each section are always arranged in the same order, hydrocarbons, halogen-, nitrogen-, hydroxy-, keto-compounds, carboxylic acids, sulphur compounds, etc.

In connection with each compound its derivatives (additive compounds, esters, ethers, phenylurethan, hydrazones, etc.) are described. It has been our endeavour to keep the system as simple as possible and to avoid separation of compounds which are most closely related chemically. Thus, anhydrides of dicarboxylic acids and lactones of hydroxy acids are dealt with directly after the corresponding acid, exceptions to this arrangement having been made only in cases where these derivatives belong to a very important heterocyclic ring system as, for instance, phthalides.

All the chief systems are introduced by a detailed schematic survey about the various formations of the nucleus concerned and that in the first place about the occurrence in nature and in technical products (coal tar, lignite tar, etc.), next about the syntheses from the systems with less carbon atoms, about the rearrangement from systems with an equal number of carbon atoms, and finally about the degradation from the more complicated systems.

We have intentionally refrained from introducing new systems of nomenclature. In cases where different methods of nomenclature and numbering exist in the literature the method which appears to be the most suitable one has been chosen.

Particular attention was paid to the composition of the index. Each volume contains a subject index as well as a formula index; they contain not only every separate compound described in that volume, but the subject index has also groups of compounds with a similar structural or functional character, e.g. compounds with

acetylene linking, fluoro-, seleno-, metal-, deuterio-compounds, mustard oils ketenes, etc., hormones, vitamins, etc. The great value of such summaries will only become clear in the general index that will be composed after completion of the whole work, but we beg to draw attention to the keywords "Carcinogenic compounds", "Hormones", "Naturally occurring compounds", "Vitamins and provitamins", which occur in this volume.

All the data from the periodicals listed below have been taken directly from the original papers. For papers from a few journals not listed Chemical Abstracts and Chemisches Zentralblatt have both been consulted.

The accomplishment of this work was greatly assisted by the kind supply of the rarer periodicals by the following libraries and we wish to express our thanks to the authorities concerned: *Koninklijke Akademie van Wetenschappen*, Amsterdam, *Technische Hoogeschool*, Delft, *Universiteit*, Amsterdam, *Universiteit*, Leiden, *Universiteit*, Utrecht, *Koloniaal Instituut*, Amsterdam, *Laboratoria voor organische*, voor *physiologische*, voor *propaedeutische* en *anorganische*, voor *analytische Chemie*, voor *Kristallographie* en *Mineralogie*, voor *Artsenijbereidkunde*, *Physiologisch Laboratorium*, *Pharmacotherapeutisch Laboratorium*, *Histologisch Laboratorium*, *Kanker Instituut* and *Hortus Botanicus*, Amsterdam.

It is a pleasure to acknowledge our indebtedness to many authors who helped us to clear up contradictions in the literature.

Amsterdam, March, 1940

E. JOSEPHY. F. RADT

GENERAL OUTLINE OF THE PLANNING OF THE ENCYCLOPÆDIA AND INDICATIONS TO FACILITATE ITS USE

Elsevier's Encyclopaedia of Organic Chemistry has been compiled on the basis of the carbon skeleton. Compounds whose carbon-skeleton is broken by other atoms*, e.g., esters, ethers, alkyl-, and acyl-derivatives of amines, hydrazines, etc., are described as derivatives of the corresponding carboxylic acid, hydroxy-, amino-, and hydrazino-compounds, etc., generally under the component which is latest in order of systematic sequence; acetyl-, benzoyl-, phthaloyl-, toluenesulphonyl-, and similar derivatives, however, are dealt with under the corresponding hydroxy- or N-compound. As far as possible, derivatives of any given substance have been grouped together, maintaining at the same time the systematic classification by cross references, or by repetition where necessary. Compounds which contain a six-membered ring as well as one of the rings described in Vol. 4 are dealt with in the latter volume. Thus, for example, phenylcyclopropane will be found with the homologues of cyclopropane in Vol. 4, and not, as a cyclopropyl derivative of benzene, in Vol. 5.

Aliphatic compounds (Vols. 1-3) and compounds with the ring systems described in Vols. 4 and 12-18 have been arranged in the same manner as the compounds with six-membered rings in Vols. 5-10. The polycyclic non-condensed compounds of each ring system are also arranged in the same manner as those of the 6-ring range (see Vol. 11), and immediately follow the respective metal compounds of the ring system in question. Accordingly,

* This does not refer to heterocyclic compounds.

examples for the following general rules can be limited to benzene compounds.

1. Compounds differing only in their degree of saturation are described in immediate succession.

2. Functional groups in the side chain have precedence over similar functional groups in the nucleus; e.g., benzyl alcohol, bis-hydroxymethyl-benzene, etc. precede phenol.

3. Hydrocarbons and compounds having the same functional groups are arranged according to the number of side chains, compounds with one side chain preceding those with two side chains, etc.

4. Compounds containing the same functional group only once are followed by those compounds which, in addition, contain a functional group treated earlier in the system. After these substances are listed the compounds in which the first-named functional group is represented twice. Hence we have the sequence: phenol and its homologues — monohalogenophenols — dihalogenophenols, etc. — nitrophenols — halogenonitrophenols — aminophenols — halogenoaminophenols — nitroaminophenols — halogenonitroaminophenols — hydroxybenzyl alcohol, etc.; dihydroxybenzenes — halogenodihydroxybenzenes, etc. In accordance with this, phenolsulphonic acid will be found in Vol. 10, and not with the hydroxy-compounds in Vol. 7.

5. In the case of tautomers preference has been given to that formulation which most adequately interprets the principal reactions of the compound. In each case, however, a cross reference was inserted, at that place where the alternate tautomeric form belongs in the system.

6. Anhydrides of dicarboxylic acids should be looked for under the latter, not under the heterocyclic compounds with 1 O. Methylene ethers of dihydroxy-compounds are considered as derivatives of the latter, not as heterocyclic compounds with 2 O; thus, piperonal, for example, will be found in Vol. 8.

7. Natural products whose constitution has not been elucidated completely but whose carbon skeleton is known to some extent are dealt with immediately following all other compounds with

the same skeleton. Other natural products are described in connection with the first product of known composition obtained in their degradation. These natural products which are scattered through the various volumes of the Encyclopaedia are systematically collected in the Group Index in Vol. 19.

The above instructions, if carefully followed, will in every case ensure a quick decision as to the volume in which to look for a particular compound. Once the right volume has been chosen, it is easy to find the compound wanted, either by consultation of the alphabetical index and the formula index at the end of the volume, or with the aid of the table of contents of the volume or of the individual skeleton systems. After the completion of the whole work, every compound described in the literature may be found irrespective of its systematic location by means of the General Subject Index (Vol. 19) and the General Formula Index (Vol. 20).

Finally, the following points should be observed:

a. The year of publication and the name of the first author are given after each item of information; in cases where several statements regarding one compound are taken from the same paper, the reference is given after the last statement. The full references are listed at the end of short sections.

b. The more important systems are preceded by a detailed survey of the various methods of formation of the nucleus concerned. First their occurrence in nature and in technical products (coal tar, lignite tar, etc.) is dealt with. This is followed by syntheses from systems with fewer carbon atoms, and then by methods of formation by degradation of more complicated systems.

TABLE OF ABBREVIATIONS EMPLOYED IN THE TEXT

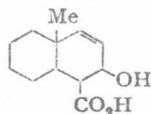
[α]	specific rotation ($[\alpha]_D^{20}$, for 20° and sodium light)	ca.	about
abs.	absolute	cal.	calorie(s)
absorpt.	absorption	calcd.	calculated
Ac	acetyl (AcCl, acetyl chloride; Ac ₂ O, acetic anhydride)	c.c.	cubic centimetre(s)
addn.	addition	cf.	compare
alc.	alcohol, alcoholic	cm.	centimetre(s)
alk.	alkaline	coeff.	coefficient
alkali	caustic alkali	compd.	compound
Am	amyl	compn.	composition
amp.	ampere(s)	conc.	concentrated
amt.	amount	concn.	concentration
anh.	anhydrous	cond.	conductivity
approx.	approximate, approximately	condens.	condensation
aq.	aqueous	const.	constant
assoc.	associate(s)	contg.	containing
assocd.	associated	cor.	corrected
assocn.	association	corresp.	corresponding
asym.	asymmetrical	crit.	critical
at.	atom, atomic	cryst.	crystalline, crystals
atm.	atmosphere(s), atmospheric	crystd.	crystallized
Å	Ångström unit(s)	crystn.	crystallization
av.	average	n	Debye unit (10^{-18} e.s.u. $\times$ cm.)
b.	(followed by a figure denoting temperature) boils at, boiling at	d	density (d_4^{13} , specific gravity at 13° referred to water at 4°)
bacteriol.	bacteriological	dec.	decomposed, decomposition
biol.	biological	deriv.	derivative
b.p.	boiling point	det.	determine
Bu	n-butyl	detd.	determined
Bz	benzoyl (BzCl, benzoyl chloride)	detn.	determination
		dextroroty.	dextrorotatory
		diazotd.	diazotized
		diazotn.	diazotization
		dil.	dilute

dild.	diluted	M.	molar
diln.	dilution	M	(with subscript) molecular refraction
dispn.	dispersion	m.	(followed by a figure denoting temperature) melts at, melting at; also metre(s)
dissoc.	dissociate(s)	ma.	milliampere(s)
dissocd.	dissociated	max.	maximum, maxima
dissocn.	dissociation	Me	methyl (MeOH, methanol)
distd.	distilled	meth.	methyl alcoholic
distg.	distilling	mg.	milligram(s)
distn.	distillation	min.	minimum; also minute(s)
elec.	electric, electrical	mixt.	mixture
e.m.f.	electromotive force	ml.	millilitre(s)
equil.	equilibrium	mm.	millimetre(s)
equiv.	equivalent	m μ	10 ⁻⁶ mm. (10 Å)
Et	ethyl (Et ₂ O, ethyl ether)	mmt.	moment
evap.	evaporate	mol.	molecule, molecular, mole
evapd.	evaporated	m.p.	melting point
evapg.	evaporating	mutarotn.	mutarotation
evapn.	evaporation	mv.	millivolt(s)
evoln.	evolution	n	index of refraction (n_D^{20} , for 20° and sodium light)
examn.	examination	N	normal (as applied to concn.)
expt.	experiment	neg.	negative
exptl.	experimental	no.	number
extrd.	extracted	obtd.	obtained
extrg.	extracting	occ.	occurrence
extrn.	extraction	opt. act.	optically active
fluoresc.	fluorescence	org.	organic
fmn.	formation	oxid.	oxidized
f.p.	freezing point	oxidn.	oxidation
fwd.	followed	p.	page
g.	gram(s)	pathol.	pathological
H ₂ SO ₄	conc. sulphuric acid	petrol.ether	petroleum ether
hr.	hour	Ph	phenyl
hydrol.	hydrolysis	pharmacol.	pharmacological
hydrold.	hydrolysed	phys.	physical
inorg.	inorganic	physiol.	physiological
insol.	insoluble	pos.	positive
isold.	isolated	powd.	powdered
isoln.	isolation	pp.	pages
°K	°Kelvin	ppt.	precipitate
kg.	kilogram(s)	pptd.	precipitated
kg-cal.	kilogram calorie(s)	pptg.	precipitating
kv.	kilovolt(s)	pptn.	precipitation
kw.	kilowatt(s)		
l.	litre(s)		
laevoroty.	laevorotatory		
lb.	pound(s)		

Pr	propyl	satg.	saturating
prepd.	prepared	satn.	saturation
prepg.	preparing	sec.	second(s), secondary
prepn.	preparation	sepd.	separated
prim.	primary	sepg.	separating
priv. comm.	private communication	sepn.	separation
prod.	product	sol.	soluble
pyr.	pyridine	soln.	solution
qual.	qualitative	soly.	solubility
quant.	quantitative	sp.	specific
rac.	racemic	sp. gr.	specific gravity
recrystd.	recrystallized	spectr.	spectrum
recrystn.	recrystallization	subl.	sublimes
red.	reduced	subln.	sublimation
redn.	reduction	subst.	substance
ref.	references	sym.	symmetrical
resoln.	resolution	synth.	synthesis
resp.	respectively	temp.	temperature
rn.	reaction	tert.	tertiary
rotn.	rotation	unsatd.	unsaturated
roty.	rotatory	v.	volt(s)
sapon.	saponification	vac.	vacuum
sapond.	saponified	vol.	volume
sapong.	saponifying	w.	watt(s)
satd.	saturated	wt.	weight

REPRODUCTION OF STRUCTURAL FORMULAE

In the structural formulae a single line always means a single bond; e.g., the formula



represents

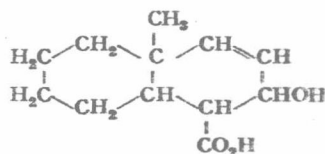


TABLE OF PERIODICALS

ABBREVIATED TITLE

Abhandl. deut. Bunsen Ges.
Acta Acad. Aboensis, Math. Phys.
Acta Brevia Neerland.

Acta Dermatol.

Acta Forestalia Fennicae
Acta Lit. Sci. Univ. Hung.
Sect. Chem. Mineral. Phys.

Acta Lit. Sci. Univ. Hung. Sect.
Sci. Nat.

Acta Med. Scand.
Acta Physicochim. U.R.S.S.
Acta Phys. Polon.
Acta Phytochim.
Acta Univ. Latviensis, Kim.
Fakult. Serija

Akust. Z.
Am. Ch. J.
Am. Dyestuff Reprtr.
Am. Gas Assoc., Proc.

Am. Gas J.
Am. J. Cancer
Am. J. Med. Sci.
Am. J. Obstet. Gynecol.
Am. J. Pharm.
Am. J. Physiol.
Am. J. Sci.
Am. Mineralogist
Am. Paint J.
Am. Perfumer Essent. Oil Rev.
Anales asoc. quim. Argentina
Anales fis. quim.
Anales soc. españ. fis. quim.
Analyst
Angew. Ch.

Ann.
Ann. Acad. Sci. Fennicae

FULL TITLE

Abhandlungen der deutschen Bunsen-Gesellschaft
 Acta Academiae Aboensis, Mathematica et Physica
 Acta Brevia Neerlandica de Physiologia, Pharmacologia, Microbiologia, e.a.

Acta Dermatologica (Dermatologia, Syphilidologia et Urologia) (Japan)

Acta Forestalia Fennicae

Acta Litterarum ac Scientiarum Regiae Universitatis Hungaricae Francisco-Josephinae. Sectio Chemica, Mineralogica et Physica. Acta Chemica, Mineralogica et Physica

Acta Litterarum ac Scientiarum Regiae Universitatis Hungaricae Francisco-Josephinae. Sectio Scientiarum Naturalium

Acta Medica Scandinavica

Acta Physicochimica U.R.S.S.

Acta Physica Polonica

Acta Phytochimica (Japan)

Acta Universitatis Latviensis, Kimijas Fakultates Serija

Akustische Zeitschrift

American Chemical Journal

American Dyestuff Reporter

American Gas Association, Proceedings of the Annual Convention

American Gas Journal

American Journal of Cancer

American Journal of the Medical Sciences

American Journal of Obstetrics and Gynecology

American Journal of Pharmacy

American Journal of Physiology

American Journal of Science

The American Mineralogist

American Paint Journal

The American Perfumer and Essential Oil Review

Anales de la asociación química Argentina

Anales de física y química (Madrid)

Anales de la sociedad española de física y química

The Analyst

Angewandte Chemie; before 1932 Zeitschrift für angewandte Chemie

Annalen der Chemie, Justus Liebig's

Annales Academiae Scientiarum Fennicae

ABBREVIATED TITLE

*Ann. acad. sci. tech. Varsovie**Ann. Applied Biol.**Ann. Botany**Ann. chim.**Ann. chim. anal. chim. appl.**Ann. chim. applicata**Ann. combustibles liquides**Ann. faculté sci. Marseille**Ann. fals.**Ann. inst. Pasteur**Ann. jardin bot. Buitenzorg**Ann. méd. légale**Ann. Philosophy**Ann. phys.**Ann. Physik**Ann. sci. École normale**Ann. sci. univ. Jassy**Ann. soc. sci. Bruxelles**Ann. Surgery**Ann. univ. Lyon**Ann. zymol.**Annual Reports**Apoth. Ztg.**Arb. biol. Reichsanstalt Land- u.
Forstw.**Arb. kais. Gesundh.**Arb. Pharm. Inst. Univ. Berlin**Arb. physiol. u. angew. Entomol.**Arb. Reichsgesundh.**Arbeitsschutz**Arch. Dermatol. Syphilol.**Arch. Dermatol. u. Syphilis**Arch. exptl. Path. Pharmakol.**Arch. exptl. Zellforsch.**Arch. farmacol. sper.**Arch. ges. Physiol.**Arch. Internal Med.**Arch. intern. pharmacodynamie**Arch. ital. biol.**Arch. Math. Naturvidenskab**Arch. néerland. physiol.**Arch. Path.**Arch. Pharm.*

FULL TITLE

Annales de l'académie des sciences techniques à
Varsovie

The Annals of Applied Biology

Annals of Botany

Annales de chimie; before 1914 Annales de chimie et de
physiqueAnnales de chimie analytique et de chimie appliquée et
Revue de chimie analytique réunies

Annali di chimica applicata

Annales de l'office national des combustibles liquides

Annales de la faculté des sciences de Marseille

Les annales des falsifications et des fraudes

Annales de l'institut Pasteur

Annales du Jardin botanique de Buitenzorg

Annales de médecine légale de criminologie, police
scientifique, médecine sociale, et toxicologie

Annals of Philosophy

Annales de physique

Annalen der Physik; before 1900 Annalen der Physik
und Chemie (Poggendorff; Wiedemann)

Annales scientifiques de l'École Normale Supérieure

Annales scientifiques de l'université de Jassy

Annales de la société scientifique de Bruxelles

Annals of Surgery

Annales de l'université de Lyon

Annales de zymologie

Annual Reports on the Progress of Chemistry, London

Apotheker Zeitung

Arbeiten aus der biologischen Reichsanstalt für Land-
und Forstwirtschaft, Berlin-Dahlem

Arbeiten aus dem Kaiserlichen Gesundheitsamte

Arbeiten aus dem Pharmazeutischen Institut der Uni-
versität BerlinArbeiten über physiologische und angewandte Ento-
mologie aus Berlin-Dahlem

Arbeiten aus dem Reichsgesundheitsamte

Arbeitsschutz, Unfallverhütung, Gewerbehygiene.

Sonderausgabe des Reichsarbeitsblattes

Archives of Dermatology and Syphilology

Archiv für Dermatologie und Syphilis

Archiv für experimentelle Pathologie und Pharma-
kologie

Archiv für experimentelle Zellforschung

Archivio di Farmacologia sperimentale e Scienze affini

Archiv. für die gesamte Physiologie des Menschen und
der Tiere (Pflügers)

The Archives of Internal Medicine

Archives internationales de pharmacodynamie et de
thérapie

Archives italiennes de biologie

Archiv for Mathematik og Naturvidenskab

Archives néerlandaises de physiologie de l'homme et
des animaux

Archives of Pathology

Archiv der Pharmazie

ABBREVIATED TITLE

*Arch. phys. biol.**Arch. Schiffs- u. Tropen-Hyg.**Arch. sci. phys. nat.**Arhiv Hem. i Farm.**Arhiv Kemi Mineral. Geol.**Asphalt u. Teer, Strassenbautech.**Astrophys. J.**Atti accad. Italia, Rend.**Atti accad. Lincei**Atti accad. Torino**Atti Congr. naz. chim. pura applicata**Australian Chem. Inst., J. & Proc.**Automobiltech. Z.**Auto-Tech.**Beitr. ch. Physiol. Pathol.**Ber.**Ber. Afdeel. Handelsmuseum Ver. Kolon. Inst.**Ber. deut. pharm. Ges.**Ber. Ges. Kohlentechn.**Ber. ges. Physiol. exptl. Pharmakol.**Ber. K. Sächs. Ges. Wiss. Math.-phys. Kl.**Ber. Schimmel & Co.**Berlin. tierärztl. Wochschr.**Berlin. u. Münch. tierärztl. Wochschr.**Berzelius-Jahresber.**Biochem. J.**Biochem. Z.**Biol. Bull.**Boll. chim. farm.**Boll. lega Ital. lotta contro cancro**Boll. soc. adriatica sci. nat. Trieste**Boll. soc. ital. biol. sper.**Bot. Ztg.**Braunkohlenarch.**Brennstoff-Ch.**Brit. J. Exptl. Path.**Brit. J. Ophthalmol.**Brit. Med. J.*

FULL TITLE

Archives de physique biologique et de chimie-physique des corps organisés; before 1930 Archives de physique biologique

Archiv für Schiffs- und Tropen-Hygiene, Pathologie und Therapie exotischer Krankheiten

Archives des sciences physiques et naturelles, Genève

Arhiv za Hemiju i Farmaciju

Arhiv för Kemi, Mineralogi och Geologi

Asphalt und Teer, Strassenbautechnik

The Astrophysical Journal

Atti della reale accademia d'Italia. Rendiconti della classe di scienze fisiche, matematiche e naturali

Atti della reale accademia dei Lincei

Atti della reale accademia delle scienze di Torino

Atti del congresso nazionale di chimica pura ed applicata

The Australian Chemical Institute Journal & Proceedings

Automobiltechnische Zeitschrift

Auto-Technik

Beiträge zur chemischen Physiologie und Pathologie
Berichte der deutschen chemischen Gesellschaft; since 1947 Chemische Berichte

Berichten van de Afdeeling Handelsmuseum van de Koninklijke Vereeniging Koloniaal Instituut

Berichte der deutschen pharmazeutischen Gesellschaft
Berichte der Gesellschaft für Kohlentechnik

Berichte über die gesamte Physiologie und experimentelle Pharmakologie

Berichte über die Verhandlungen der Königl. Sächsischen Gesellschaft der Wissenschaften zu Leipzig, Mathematisch-physische Klasse

Bericht der Schimmel & Co. Aktien-Gesellschaft
Miltitz Bz. Leipzig über ätherische Öle, Riechstoffe usw.

Berliner tierärztliche Wochenschrift

Berliner und Münchener tierärztliche Wochenschrift

Jahresberichte über die Fortschritte der physischen Wissenschaften 1822-'41, Jahresberichte über die Fortschritte der Chemie 1842-'51 von Jacob Berzelius

The Biochemical Journal

Biochemische Zeitschrift

The Biological Bulletin

Bollettino chimico-farmaceutico

Bollettino della lega Italiana per la lotta contro il cancro
Bollettino della società adriatica di scienze naturali in Trieste

Bollettino della società italiana di biologia sperimentale

Botanische Zeitung

Das Braunkohlenarchiv

Brennstoff-Chemie

British Journal of Experimental Pathology

The British Journal of Ophthalmology

British Medical Journal

ABBREVIATED TITLE

*Bul. chim. soc. română științe**Bul. chim. soc. române chim.**Bull. soc. chim. România**Bul. soc. române științe**Bul. soc. științe București**Bul. soc. științe Cluj**Bull. acad. imp. sci. St.**Petersbourg**Bull. acad. méd.**Bull. acad. roy. méd. Belg.**Bull. acad. roy. sci. Belg.**Bull. acad. sci. Russie**Bull. acad. sci. U.R.S.S.**Bull. assoc. franç. cancer**Bull. Ch. Soc. Japan**Bull. classe sci., Acad. roy. Belg.**Bull. Imp. Inst.**Bull. Inst. Phys. Ch. Research**Bull. inst. pin**Bull. inst. recherches biol. Perm**Bull. intern. acad. polon.**Bull. Jardin bot. Buitenzorg**Bull. mat. grasses**Bull. sci. acad. roy. Belg.**Bull. sci. ind. Roure-Bertrand fils**Bull. sci. pharmacol.**Bull. sect. sci. acad. roumaine**Bull. soc. chim.**Bull. soc. chim. Belg.**Bull. soc. chim. biol.**Bull. soc. franç. minéral.**Bull. soc. ind. Mulhouse**Bull. soc. minéral. France**Bull. soc. naturalistes Moscou**Bull. soc. pharm. Bordeaux**Bull. soc. roumaine phys.*

FULL TITLE

Buletinul de chimie pură și aplicată societatea română de științe

Buletinul de chimie pură și aplicată al societății române de chimie

Buletinul societății de chimie din România

Buletinul societății române de științe, București-România

Buletinul societății de științe din București, România

Buletinul societății de științe din Cluj

Bulletin de l'académie impériale des sciences de St. Petersbourg

Bulletin de l'académie de médecine

Bulletin de l'académie royale de médecine de Belgique

Bulletins de l'académie royale des sciences, des lettres et des beaux-arts de Belgique

Bulletin de l'académie des sciences de Russie

Bulletin de l'académie des sciences de l' Union des Républiques Soviétiques Socialistes, Classe des sciences mathématiques et naturelles

Bulletin de l'association française du cancer

Bulletin of the Chemical Society of Japan

Bulletin de la classe des sciences, Académie royale de Belgique (Mededeelingen van de Klasse der Wetenschappen, Koninklijke Belgische Academie)

Bulletin of the Imperial Institute

Bulletin of the Institute of Physical and Chemical Research (Tokyo)

Bulletin de l'institut du pin

Bulletin de l'institut des recherches biologiques de Perm

Bulletin international de l'académie polonaise des sciences et des lettres, Classe des sciences mathématiques et naturelles; before 1919 Bulletin international de l'académie des sciences de Cracovie

Bulletin du Jardin botanique de Buitenzorg

Bulletin des matières grasses de l'institut colonial de Marseille

Bulletin de la classe des sciences, académie royale de Belgique

see *Recherches Roure-Bertrand fils*

Bulletin des sciences pharmacologiques

Bulletin de la section scientifique de l'académie roumaine

Bulletin de la société chimique de France

Bulletin de la société chimique de Belgique et Recueil des travaux chimiques belges

Bulletin de la société de chimie biologique

Bulletin de la société française de minéralogie

Bulletin de la société industrielle de Mulhouse

Bulletin de la société minéralogique de France

Bulletin de la société des naturalistes de Moscou

Bulletin des travaux de la société de pharmacie de Bordeaux

Bulletin de la société roumaine de physique