

C07B

GENERAL METHODS OF ORGANIC CHEMISTRY; APPARATUS THEREFOR (preparation of carboxylic acid esters by telomerisation [C07C 67/47](#); telomerisation [C08F](#))

Definition statement

This place covers:

General methods for the preparation of organic compounds which are of general applicability, in which the method itself is of interest rather than the product. Such methods are:

Reduction and oxidation in general;

Reactions with or without formation or introduction of functional groups containing heteroatoms;

Halogenation;

Grignard reactions;

Introduction of protecting groups or activating groups;

Asymmetric syntheses;

Racemisation;

Complete or partial inversion;

Separation of optically-active compounds;

Introduction of isotopes of elements into organic compounds and isotopically labelled compounds per se;

Purification

Separation

Stabilisation

Apparatus suitable for carrying out the general methods for the preparation of organic compounds

Relationships with other classification places

General methods for preparation of organic compounds are organic transformations which can be classified in various other [C07](#) subclasses but because of its general character are also classified in [C07B](#). If for a wider range of compounds, which are to be classified in more [C07](#) subclasses ([C07D](#), [C07C](#) etc.), an OH group is introduced as an example, this would have to be classified in [C07B 41/02](#). The formation of the hydroxy group would also have to be classified in the neighbouring types or groups of organic compounds for the various different subclasses of [C07](#).

MULTIPLE CLASSIFICATION

Biocidal, pest repellent, pest attractant, or plant growth regulatory activity of chemical compounds or preparations is further classified in [A01P](#).

Therapeutic activity of chemical compounds or medicinal preparations is further classified in subclass [A61P](#).

Uses of cosmetics or similar toilet preparations are further classified in subclass [A61Q](#).

References

Limiting references

This place does not cover:

Organic reactions which are not of generic character	Other C07 class
Preparation of carboxylic esters by telomerisation	C07C 67/47
Processes for preparing macromolecular compounds, e.g. telomerisation	C08F , C08G
Fermentation or enzyme-using processes to synthesise a desired chemical compound or composition or to separate optical isomers from a racemic mixture	C12P
Production of organic compounds by electrolysis or electrophoresis	C25B 3/00 , C25B 7/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Chromatography	B01D 15/08
Apparatus	B01J 2/00 - B01J 19/00
Catalysts	B01J 21/00 - B01J 35/00
Process classes in other (non-general) C07 subclasses for the individual reactions.	C07C , C07D , C07E , C07H , C07J
Preparation, separation, purification or stabilisation of hydrocarbons	C07C 1/00 - C07C 7/00
Preparation, separation, purification or stabilisation of unsubstituted lactams	C07D 201/00
Process for preparation of steroids, in general	C07J 75/00
General process for the preparation of peptides	C07K 1/00

Special rules of classification

- In this subclass, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place according to the type of reaction employed, noting the bond or the functional group which is formed or introduced as a result of the chemical reaction.
- When classifying in this subclass all relevant symbols should be assigned. For example, if a document discloses stereoselective reactions ([C07B 53/00](#)) as well as substitution reactions ([C07B 37/04](#)), classification in both groups should be attributed.
- When classifying in this subclass, classification is also made in group [B01D 15/08](#) insofar as subject matter of general interest relating to chromatography is concerned.
- Classified are processes as claimed in the claims when it has been shown in the real examples that the reactions are of generic character, i.e. that they are classified in various other [C07](#) classes.
- A functional group which is already present in some residue being introduced and is not substantially involved in a chemical reaction, is not considered as the functional group which is formed or introduced as a result of the chemical reaction.
- If a document concerns reactions in different main groups, classes should be given for all these main groups (e.g. if a document concerns hydrogenation reactions of isotopically labelled benzenes, a [C07B 35/02](#) class and a [C07B 59/00](#) class is given).
- [C07B 59/00](#) and subgroups thereof are used for the classification of individual labelled compounds as well as for general methods.
- [C07B 61/02](#) is used for the classification of individual free radical as well as for general methods.

- If the generic reaction involves the use of charge transfer complexes, the [C07B 2200/01](#) Indexing Code is given.
- If the generic reaction involves free radicals, the [C07B 2200/03](#) code is given.
- If the generic reaction involves the use of a solid support, the [C07B 2200/11](#) Indexing Code is given.
- When the generic reaction involves fullerenes, the [C07C 2604/00](#) Indexing Code is given.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Asymmetric synthesis	Process that produce optically active compounds from symmetrically constituted molecules by the intermediate use of optically active reagents, but without the use of any of the methods of resolution
Functional group	Group of atoms within a molecule that is responsible for certain properties of the molecule and reactions in which it takes part
Grignard reaction	Addition of organomagnesium compounds (Grignard reagents) to carbonyl groups or other unsaturated groups to give alcohols or ketones
Inversion	The spatial rearrangement of atoms or groups of atoms in a disymmetric molecule, giving rise to a product with a molecular configuration that is a mirror image of that of the original molecule
Isotopically labelled compound	Compounds with an unusual isotope in one or more of its elements. By unusual is meant that the isotope does not exist in high amounts naturally
Racemisation	Conversion, by heat or by chemical reaction of an optically active compound into an optically inactive form in which half of the optically active substance becomes its mirror image (enantiomer). This change results in a mixture of equal quantities of dextro- and levorotatory isomers, as result of which the compound does not rotate plane-polarized light to either right or left since the two opposite rotations cancel each other
Separation	Means separation only for the purposes of recovering organic compounds

C07B 31/00

Reduction in general

Definition statement

This place covers:

General reduction reactions. Documents are classified in this class when there are more reductions disclosed in different classes. The reductions are applicable to a wide range of reactants.

Reductions are reactions where oxygen is removed and replaced by hydrogen (nitrobenzene to aminobenzene), which is different from hydrogenation reactions where hydrogen is added (conversion alkyne to alkene).

References

Limiting references

This place does not cover:

Hydrogenations of unsaturated carbon bonds are classified in C07B 35/02 .	C07B 35/02
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Formation of hydrocarbons by reduction of an oxygen or nitrogen containing compound.	C07C 1/22 , C07C 27/04 , C07C 29/132- C07C 29/149 , C07C 51/377 , C07C 209/24- C07C 209/52
Hydrodeoxygenation.g. $\text{HO-CH}_2\text{-CH}_2\text{OH} \rightarrow \text{CH}_3\text{-CH}_2\text{-OH}$	C07C 29/60 , C07C 67/317

Synonyms and Keywords

The term hydrogenation is sometimes used for reduction. In principle, hydrogenation involves addition of hydrogen only, whereas reduction involves addition of hydrogen and simultaneous removal of oxygen.

C07B 33/00

Oxidation in general

Definition statement

This place covers:

General oxidation reactions. Documents are classified in this class when there are more oxidations disclosed in different classes. The oxidations are applicable to a wide range of reactants. Oxidation can be seen as creating compounds by losing electrons (or the increase in oxidation state). An example of such a generic oxidation are oxidation of tetralin to tetralone as well as formation of epoxides from alkenes as well as formation of alcohols from cycloalkanes in the same document.

References

Limiting references

This place does not cover:

Dehydrogenation reactions without formation or introduction of functional groups containing heteroatoms involving a change in the type of bonding between two carbon atoms already directly linked only	C07B 35/04
Formation of alcohols only	C07B 41/02
Formation of carbonyl groups only	C07B 41/04
Formation of carboxylic groups or salts, halides or anhydrides thereof only	C07B 41/08- C07B 41/10
Formation of carboxylic acid ester groups only	C07B 41/12
Formation of amide groups only	C07B 43/06

Formation of cyano groups only	C07B 43/08
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Formation of carboxylic acids or their salts, halides or anhydrides thereof	C07C 51/16 - C07C 51/34
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C07B 35/00

Reactions without formation or introduction of functional groups containing hetero atoms, involving a change in the type of bonding between two carbon atoms already directly linked

Definition statement

This place covers:

General organic reactions whereby no functional groups are formed. Classified are general organic reactions wherein only the type of bonding of a C-C bond is changed, like:

- Hydrogenation of carbon-carbon double bonds ([C07B 35/02](#))
- Dehydrogenation ([C07B 35/04](#))
- Decomposition by e.g. elimination of halogens, water or hydrogen halides ([C07B 35/06](#))
- Isomerization ([C07B 35/08](#))

References**Limiting references**

This place does not cover:

Reductions whereby oxygen is removed and replaced by hydrogen (e.g. nitrobenzene to aminobenzene)	C07B 31/00
Isomerization reactions leading to the formation or disconnection of a C-C bond (olefin methathesis)	C07B 37/08

Informative references

Attention is drawn to the following places, which may be of interest for search:

Decomposition of hydrocarbons	C07C 1/24 , C07C 17/363 , C07C 29/58
Hydrogenation of of C-C multiple bonds	C07C 5/02 - C07C 5/13 , C07C 17/354 , C07C 29/17 - C07C 29/20 , C07C 41/20 , C07C 45/62 , C07C 51/36 , C07C 67/283 , C07C 67/303 , C07C 209/70 - C07C 209/72

Isomerization of hydrocarbons	C07C 5/13 , C07C 5/22- C07C 5/31 , C07C 17/358 , C07C 45/67 , C07C 51/353 , C07C 67/293 , C07C 67/333
Preparation of C-C multiple bonds by dehydrogenation	C07C 5/32- C07C 5/56 , C07C 17/357 , C07C 37/06 , C07C 67/297 , C07C 67/317

C07B 37/00

Reactions without formation or introduction of functional groups containing hetero atoms, involving either the formation of a carbon-to-carbon bond between two carbon atoms not directly linked already or the disconnection of two directly linked carbon atoms

Definition statement

This place covers:

General organic reactions whereby no functional groups are formed. Classified are general organic reactions wherein a C-C bond is either created or broken like:

- Addition reactions ([C07B 37/02](#))
- Substitution reactions, e.g. transition metal catalyzed C-C couplings ([C07B 37/04](#))
- Decomposition reactions, e.g. elimination of carbon dioxide ([C07B 37/06](#))
- Isomerization reactions, olefin methathesis ([C07B 37/08](#))
- Cyclization reactions, e.g. Diels Alder and ring closing methathesis ([C07B 37/10](#) and [C07B 37/12](#))

References

Limiting references

This place does not cover:

Isomerization reactions wherein only the type of bonding between two carbon atoms have been changed.	C07B 35/08
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Formation of C-C bonds	C07C 2/00 , C07C 17/272- C07C 17/30 , C07C 17/358 , C07C 29/44- C07C 29/46 , C07C 37/11- C07C 37/14 , C07C 45/68- C07C 45/69 , C07C 67/343- C07C 67/347
Breaking of C-C bonds	C07C 4/00 , C07C 17/361- C07C 17/367 , C07C 51/38 , C07C 67/475

Metathesis of C-C bonds	C07C 6/00
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C07B 39/00

Halogenation

Definition statement

This place covers:

General organic reactions involving the creation of a carbon-halogen bond.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preparation of halogenated hydrocarbons	C07C 17/00 , C07C 29/62 , C07C 37/62 , C07C 67/287 , C07C 67/307
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C07B 41/00

Formation or introduction of functional groups containing oxygen

Definition statement

This place covers:

General organic reactions whereby a functional group containing oxygen is introduced. Reactions which are classified are:

- formation of hydroxy or O-metal compounds ([C07B 41/02](#))
- formation of ether, acetal or ketal groups ([C07B 41/04](#))
- formation of carbonyl groups ([C07B 41/06](#))
- formation of carboxyl groups or salts, halides or anhydrides thereof ([C07B 41/08](#) and [C07B 41/10](#))
- formation of carboxylic acid ester groups ([C07B 41/12](#))
- formation of peroxy or hydroperoxy groups ([C07B 41/14](#))

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Oxidation of hydrocarbons	C07C 27/10
Preparation of hydroxy compounds by oxidation	C07C 29/48 - C07C 29/54
Preparation of metal-alcoholates by oxidation of metal-carbon bonds	C07C 29/72
Preparation of compounds having an hydroxy or O-metal group bound to a carbon atom of a six-membered aromatic ring by oxidation of a C-H group	C07C 37/58 - C07C 37/60
Preparation of ethers	C07C 41/00
Preparation of C=O groups bound only to carbon or hydrogen atoms	C07C 45/27 - C07C 45/40
Preparation of quinones by oxidation	C07C 46/02 - C07C 46/08

Informative references

Preparation of carboxylic acids / anhydrides by oxidation	C07C 51/16 - C07C 51/34
Preparation of carboxylic acid esters by oxidation	C07C 67/05 - C07C 67/055 , C07C 67/39 - C07C 67/44
Preparation of carboxylic esters by introduction of oxygen-containing functional groups	C07C 67/29 , C07C 67/34 , C07C 67/313
Preparation of carbonic or haloformic acid esters	C07C 68/00
Preparation of carboxyl groups in compounds containing amino groups	C07C 227/02
Preparation of nitriles by oxidation	C07C 253/24 - C07C 253/28

C07B 43/00**Formation or introduction of functional groups containing nitrogen****Definition statement**

This place covers:

General organic reactions whereby a functional group containing nitrogen is introduced. Reactions which are classified are:

- formation of nitro or nitroso groups ([C07B 43/02](#))
- formation of amino groups ([C07B 43/04](#))
- formation of amide groups ([C07B 43/06](#))
- formation of cyano groups ([C07B 43/08](#))
- formation of isocyanate groups ([C07B 43/10](#))

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

Preparation of esters of nitric or nitrous acid or of compounds containing nitro or nitroso groups bound to a carbon skeleton	C07C 201/00
Preparation of optionally substituted amines	C07C 209/00 , C07C 213/00 , C07C 221/00
Preparation of optionally substituted aminoacids	C07C 227/00
Preparation of amides	C07C 231/00
Preparation of hydrazines/hydrazides	C07C 241/00
Preparation of imines, oximes and hydrazones	C07C 249/00
Preparation of nitriles	C07C 253/00
Preparation of derivatives of isocyanic acid	C07C 263/00

C07B 45/00

Formation or introduction of functional groups containing sulfur

Definition statement

This place covers:

General organic reactions whereby a functional group containing sulfur is introduced. Reactions which are classified are:

- formation of sulfo (-S(O)₃H) or sulfonyldioxy groups (-OS(O)₂O-) ([C07B 45/02](#))
- formation of sulfonyl (-S(O)₂-) or sulfinyl (-SO) groups ([C07B 45/04](#))
- formation of mercapto (-SH) or sulfide (-S-) groups ([C07B 45/06](#))

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preparation of sulfonic acids	C07C 303/02- C07C 303/22
Preparation of esters of sulfuric acids	C07C 303/24
Preparation of esters of sulfonic acids	C07C 303/26- C07C 303/30
Preparation of salts of sulfonic acids	C07C 303/32
Preparation of amides of sulfuric acids	C07C 303/34
Preparation of amides of sulfonic acids	C07C 303/36- C07C 303/40
Preparation of sulfones and sulfoxides by oxidation of sulfoxides and sulfides	C07C 315/02
Preparation of thiols	C07C 319/02- C07C 319/12
Preparation of sulfides	C07C 319/14- C07C 319/20

C07B 47/00

Formation or introduction of functional groups not provided for in groups [C07B 39/00](#) - [C07B 45/00](#)

Definition statement

This place covers:

General organic reactions whereby a functional group other than oxygen nitrogen or sulfur is introduced.

An example would be trifluoromethylation of organic compounds.

C07B 49/00

Grignard reactions

Definition statement

This place covers:

General organic reactions involving Grignard reactions. An example would be the conversion of various ketones to substituted alcohols, wherein the products are heterocyclic group containing alcohols, aliphatic alcohols and alcohols containing other functional groups like thio groups; the substrates containing these various other groups already.

References

Limiting references

This place does not cover:

The Grignard complexes	C07F 3/02
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Substitution reactions, e.g. transition metal catalyzed C-C couplings	C07B 37/04
Magnesium compounds	C07F 3/02

C07B 51/00

Introduction of protecting groups or activating groups, not provided for in the preceding groups

Definition statement

This place covers:

General organic reactions wherein a protecting or activating group is introduced which does not belong to oxygen, nitrogen, sulfur functional groups. An example would be the protection of alcohols and/or diols with various 2-norbornylsilyl groups, wherein the alcohols are classified over various [C07](#) groups, like acyclic alcohols, heterocyclic group containing alcohols etc.

C07B 53/00

Asymmetric syntheses

Definition statement

This place covers:

Organic reactions wherein an asymmetric center is created.

References

Limiting references

This place does not cover:

Complete or partial inversion	C07B 55/00
Kinetic resolution / separation of optically-active compounds	C07B 57/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical isomers	C07B 2200/07
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Synonyms and Keywords

Asymmetric synthesis	enantioselective synthesis
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C07B 55/00**Racemisation; Complete or partial inversion****Definition statement**

This place covers:

Organic reactions wherein an asymmetric carbon atom with enantiomeric excess is racemised or wherein complete or partial inversion occurs at such a carbon atom. An example would be the asymmetric hydrogenation of acetophenone leading to (R)-1-phenethylalcohol.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

See groups in Isomerization	C07B 35/08 and other C07C classes mentioned in C07B 35/08
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C07B 57/00**Separation of optically-active compounds****Definition statement**

This place covers:

In this main group processes involving separation of optically active compounds (enantiomers, diastereomers) are classified. Kinetic resolution is also classified here.

References**Informative references**

Attention is drawn to the following places, which may be of interest for search:

See separation classes mentioned in informative references in:	C07B 63/00
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C07B 59/00

Introduction of isotopes of elements into organic compounds {; Labelled organic compounds per se}

Definition statement

This place covers:

Introduction of non-natural isotopes of elements into organic compounds and the labelled compounds per se. Distinction is made between the various compounds:

- acyclic or carbocyclic compounds : [C07B 59/001](#)
- heterocyclic compounds : [C07B 59/002](#)
- acyclic, carbocyclic or heterocyclic compounds containing elements other than carbon, hydrogen, halogen, oxygen, nitrogen, sulfur, selenium or tellurium: [C07B 59/004](#)
- sugars; derivatives thereof; nucleosides; nucleotides; nucleic acids: [C07B 59/005](#)
- steroids: [C07B 59/007](#)
- peptides: [C07B 59/008](#)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Isotopically modified compounds	C07B 2200/05
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C07B 61/00

Other general methods

Definition statement

This place covers:

General organic reactions which do not fit anywhere else. Generation of free radicals and organic free radicals per se. ([C07B 61/02](#)).

An example would be the formation of free radicals of various compounds classified over the whole range of [C07](#), like heterocyclic compounds, acyclic compounds like ketones, esters and amines etc.

References

Limiting references

This place does not cover:

Simultaneous synthesis of five or more different compounds (libraries)	C40B 10/00 - C40B 99/00
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C07B 63/00

Purification; Separation (separation of optically-active compounds [C07B 57/00](#)); Stabilisation; Use of additives

Definition statement

This place covers:

Purification of organic compounds in general, separation of organic compounds in general. Also classified are stabilization of organic compounds or mixtures as well as the use of additives for stabilizing compounds (e.g. piperidine-N-oxides for stabilizing monomers).

References**Limiting references**

This place does not cover:

Separation of optically active compounds	C07B 57/00
Anti-oxidant compositions or compositions inhibiting chemical change in general	C09K 15/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Purification, separation or stabilization of organic compounds	C07C 7/00 , C07C 17/38- C07C 17/42 , C07C 27/26- C07C 27/34 , C07C 29/74- C07C 29/94 , C07C 37/68- C07C 37/88 , C07C 41/34- C07C 41/46 , C07C 41/58 , C07C 45/78- C07C 45/86 , C07C 45/90 , C07C 46/10 , C07C 51/42- C07C 51/50 , C07C 51/573 , C07C 51/64 , C07C 67/48- C07C 67/62 , C07C 68/08 , C07C 201/16 , C07C 209/82- C07C 209/90 , C07C 213/10 , C07C 227/38- C07C 227/44 , C07C 231/22- C07C 231/24 , C07C 249/14 , C07C 253/32- C07C 253/34 , C07C 263/18- C07C 263/20 , C07C 269/08 , C07C 273/14- C07C 273/16 , C07C 277/06 , C07C 303/42- C07C 303/44 , C07C 315/06 , C07C 319/26- C07C 319/28 , C07C 407/003 , C07C 407/006
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