

DEPARTAMENTO DE QUÍMICA INORGÁNICA

Tutorial sobre [Organic Chemistry Portal](https://www.organic-chemistry.org)
<https://www.organic-chemistry.org>

Ángela Vivancos Ureña

La página web <https://www.organic-chemistry.org> ofrece, entre otros recursos, un listado de las reacciones más importantes en química orgánica y una selección de artículos relacionados con la síntesis orgánica que se va actualizando periódicamente. Dicho recurso resulta especialmente interesante para alumnos de los últimos cursos del Grado en Química.

En la página principal encontramos las distintas opciones que ofrece este portal. En la siguiente imagen se puede ver la interfaz de la página de inicio y las principales herramientas que presenta.

The screenshot shows the homepage of the Organic Chemistry Portal. On the left, there is a navigation menu with a red box highlighting the 'Main Categories' section, which includes 'Organic Reactions', 'Org. Chem. Highlights', 'Abstracts', 'Chemicals', 'Chemistry Tools', 'Chemistry Books', 'Job Market', and 'Product of the Month'. Below this, there are links for 'C-H activation with PolyCYPs+', 'Archive', 'Resources & Suppliers', 'Advertisement', and 'Imprint'. The main content area features a search bar, social media sharing options, and a 'From SINCOMPOUND' banner. Below this, there is a 'Product of the Month' section for 'PolyCYPs enzymes' with a 'Learn more' button. The page also lists several recent articles with their titles and authors, such as 'The Dong Synthesis of Phainoid A' and 'C-H Functionalization: The Davies/Sorensen Synthesis of Aflatoxin B₂'. At the bottom, there are four columns of links: 'Organic Reactions', 'Abstracts', 'Chemicals', and 'Chemistry Tools', each with a brief description of the resource.

Dentro de la categoría '**Organic Reactions**', pinchando en el apartado '**Name reactions**' podemos encontrar un extenso listado de reacciones orgánicas clasificadas por nombre y ordenadas alfabéticamente.

Organic Chemistry Portal

Site Search >>
 any all words

Main Categories
 Organic Reactions
 Org. Chem. Highlights
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 Product of the Month
 C-H activation with
 PolyCYPs+
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 Resources & Suppliers
 Advertisement
 Imprint

Organic Chemistry Portal
 Reactions >> Search, Name Reactions, Protecting Groups, Special Topics

Organic Reactions

Name Reactions

Contains information on the most important Name Reactions and keywords for the field of organic synthesis.

Organic Synthesis Search
 A graphical index of bond types provides links to search for specific transformations of interest and locate examples to use in solving synthetic problems.

Protecting Groups
 The Protecting Groups list contains stability data for the most important groups. The coverage of current protection and deprotection methods is continuously expanded.

Total Syntheses
 Total synthesis has its roots in the mid-19th century, primarily as means for confirmation of structures. Today, scale-up and analogue synthesis of recently uncovered biochemically active species is more important.

Special Topics
[Flow Chemistry](#), [Green Chemistry](#), [Microwave Synthesis](#), [Multicomponent Reactions](#), [Organocatalysis](#), [Sonochemistry](#)

Organic Chemistry Portal

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Organic Chemistry Portal
 Reactions

Name Reactions

Please use the following URL if you want to set a link: <https://www.organic-chemistry.org/namedreactions/>

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

^ a
 Acetoacetic Ester Condensation
 Acetoacetic Ester Synthesis
 Acyloin Condensation
 Alder-Ene Reaction
 Aldol Addition
 Aldol Condensation
 Appel Reaction
 Arbuzov Reaction
 Arndt-Eistert Synthesis
 Azide-Alkyne 1,3-Dipolar Cycloaddition
 Azo Coupling

^ b
 Baeyer-Villiger Oxidation
 Baker-Venkataraman Rearrangement
 Balz-Schiemann Reaction
 Bamford-Stevens Reaction
 Barton Decarboxylation

Cada uno de los enlaces a los distintos nombres de reacción incluye un esquema general con la correspondiente explicación a la reacción en cuestión, el esquema del mecanismo de reacción, un enlace a bibliografía relacionada y los nombres (con sus correspondientes links) de reacciones similares.

A continuación, se muestra la reacción de acoplamiento de Buchwald-Hartwig (**Buchwald-Hartwig Cross Coupling Reaction**), y podemos ver que aparecen los enlaces a la bibliografía (**Literature**) y a las reacciones relacionadas (**Related Reactions**: Chan-Lam Coupling, Ullmann Reaction, Synthesis of aryl amines, Synthesis of diaryl ethers).

Further Information
 Literature

Related Reactions
 Chan-Lam Coupling
 Ullmann Reaction
 Synthesis of aryl amines
 Synthesis of diaryl ethers

Buchwald-Hartwig Cross Coupling Reaction

$$\text{R-C}_6\text{H}_4\text{-X} + \text{H}_2\text{NR}' \xrightarrow[\text{dioxane, 100}^\circ\text{C}]{\text{PdCl}_2(\text{dppf}) (\text{cat.}), \text{NaOtBu}} \text{R-C}_6\text{H}_4\text{-NHR}'$$

R = Alkyl, CN, COR, ...
 R' = Alkyl, Aryl

Palladium-catalyzed synthesis of aryl amines. Starting materials are aryl halides or pseudohalides (for example triflates) and primary or secondary amines.

$$\text{Ar-X} + \text{HO-Ar}' \xrightarrow[\text{toluene, 100}^\circ\text{C}]{\text{Pd}(\text{OAc})_2 (\text{cat.}), \text{ligand}, \text{K}_3\text{PO}_4} \text{Ar-O-Ar}'$$

X: Cl, Br

The synthesis of aryl ethers and especially diaryl ethers has recently received much attention as an alternative to the [Ullmann Ether Synthesis](#).
 Newer catalysts and methods offer a broad spectrum of interesting conversions.

Mechanism of the Buchwald-Hartwig Coupling

Otra interesante utilidad que presenta la categoría 'Organic Reactions' es la de 'Protecting groups'.

Organic Chemistry Portal

Site Search >>
 any all words

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BIOSYNTHESIS - intermediates and building blocks for organic synthesis and drug discovery
Carbosynth

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Aquí se puede encontrar una lista de los grupos protectores más importantes y, dentro de cada uno de estos grupos, aparecen los datos de estabilidad y los métodos de desprotección.

Organic Chemistry Portal
Reactions >> Protecting Groups >> Stability

Protecting Groups

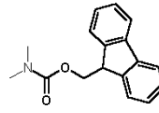
Stability data for the most frequently used protective groups, protection and deprotection methods

Functional Groups:


- Amino
- Carbonyl
- Carboxyl
- Hydroxyl (1,2-, 1,3-Diols)

Amino >> Stability

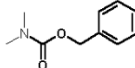
9-Fluorenylmethyl carbamate (Fmoc-NRR')




t-Butyl carbamate (Boc-NRR')




Benzyl carbamate (Z-NRR', Cbz-NRR')



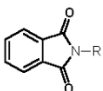
Acetamide



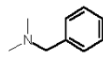
Trifluoroacetamide




Phthalimide



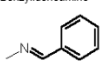
Benzylamine (Bn-NRR')



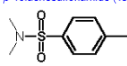
Triphenylmethylamine (Tr-NRR')



Benzylideneamine



p-Toluenesulfonamide (Ts-NRR')



Como ejemplo, se muestran a continuación los datos que podemos encontrar sobre el grupo *tert*-butil carbamato. En la tabla aparece la estabilidad de dicho grupo en agua, a distintos pHs, frente a bases, nucleófilos, electrófilos y frente a reacciones de oxidación y reducción.

Organic Chemistry Portal
Reactions >> Protecting Groups >> Stability

tert-Butyl carbamates

BOC-NR₂, BOC amines, BOC amino, BOC amide

T. W. Green, P. G. M. Wuts, *Protective Groups in Organic Synthesis*, Wiley-Interscience, New York, 1999, 518-525, 736-739.

Stability

	pH < 1, 100°C	pH = 1, RT	pH = 4, RT	pH = 9, RT	pH = 12, RT	pH > 12, 100°C
Bases:	LDA	NEt ₃ , Py	t-BuOK	Others:	BOC	ROO ₂
Nucleophiles:	RLi	RMgX	ROsO ₄	Enolates:	TMH, R ₃ NH ₂	NaOCH ₃
Electrophiles:	NO ₂ Cl	RCOCl	CH ₃ I	Others:	SO ₂	SO ₂ Cl ₂
Reductions:	H ₂ / Ni	H ₂ / Rh	Zn / HCl	LiAlH ₄	LiAlH ₄	LiAlH ₄
Oxidations:	KMnO ₄	OxO ₄	OxO ₄ / Py	CrO ₃ /HOAc	Cr, Br ₂ , O ₃	MnO ₂ / CH ₂ Cl ₂

General

The formation of Boc-protected amines and amino acids is conducted under either aqueous or anhydrous conditions, by reaction with a base and the anhydride Boc₂O. Active esters and other derivatives such as Boc-OH₂ and Boc-N₃ can also be used.

$$R-NH_2 + \text{Boc}_2O \xrightarrow[\text{H}_2O, \text{THF}]{\text{NaHCO}_3} R-NH-CO-O-C(CH_3)_3 \xrightarrow[\text{diarsane}]{\text{HCl}} R-NH_2$$

The Boc group is stable towards most nucleophiles and bases. Therefore, an orthogonal protection strategy using a base-labile protection group such as Fmoc is possible. *tert*-Butyl carbamates are cleaved under anhydrous acidic conditions with the production of *tert*-butyl cations. Scavengers such as thiophenol may prevent nucleophilic substrates from being alkylated.