



## Palladium-Phosphine Catalysts

# HERAEUS – YOUR EXPERT FOR PALLADIUM PHOSPHINE CATALYSTS

## INTRODUCTION

Coupling reactions play an important part in the syntheses of sophisticated active ingredients for pharmaceutical, agro- and fine-chemistry.

Many of these coupling reactions run with the help of homogeneous palladium phosphine catalysts. Heraeus offers a variety of such C-C and C-N coupling catalysts.

## C-C COUPLING REACTIONS

Figure 1 shows an example of the original Suzuki coupling reaction. By adaption of the palladium phosphine complex, a broad variety of molecules can be utilized in this reaction. Other coupling reactions like Stille and Heck also make use of such palladium phosphine complexes. Heraeus offers a choice of palladium complexes, which provide the best catalytic efficiency for each coupling reaction of interest, as shown in the table below.

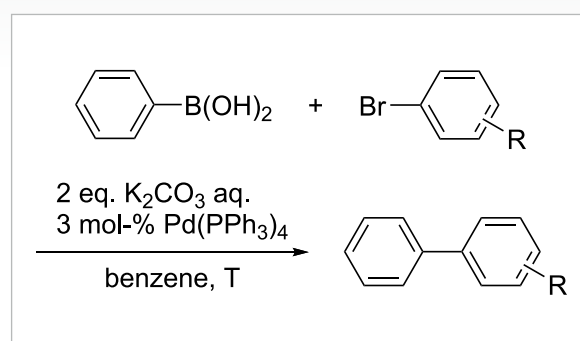


Figure 1: General example of a Suzuki coupling reaction.

## PALLADIUM PHOSPHINE COMPLEXES FOR C-C COUPLING REACTIONS

Heraeus has developed industrial processes for multiple palladium phosphine catalysts. Each catalyst has its own strength depending on

the choice of coupling conditions. Our catalysts are available from sample to bulk quantities and can be shipped globally.

	Buchwald Hartwig	Heck	Hiyama	Negishi	Sonogashira	Stille	Suzuki
$\text{Pd}(\text{dppf})\text{Cl}_2$		×		×			×
$\text{Pd}(\text{dppp})\text{Cl}_2$				×	×		×
$\text{Pd}(\text{dppb})\text{Cl}_2$		×		×		×	×
$\text{Pd}(\text{dppf})\text{Cl}_2$		×		×	×	×	×
$\text{Pd}(\text{Amphos})_2\text{Cl}_2$							×
$\text{Pd}(\text{P}(\text{oTol})_3)_2\text{Cl}_2$	×	×		×		×	×
$\text{Pd}(\text{PCy}_3)_2\text{Cl}_2$		×	×		×		×

# PALLADIUM PHOSPHINE CATALYSTS AVAILABLE PORTFOLIO

## Dichloro-[1,2-bis-(diphenylphosphino)-ethane]-palladium(II)



**Pd(dppe)Cl<sub>2</sub>**  
CAS 19978-61-1  
17.5–19.5% Pd  
Purity >97%

## Dichloro-[1,3-bis-(diphenylphosphino)-propane]-palladium(II)



**Pd(dppp)Cl<sub>2</sub>**  
CAS 59831-02-6  
17.0–19.0% Pd  
Purity >97%

## Dichloro-[1,4-bis-(diphenylphosphino)-butane]-palladium(II)



**Pd(dppb)Cl<sub>2</sub>**  
CAS 29964-62-3  
16.6–18.6% Pd  
Purity >97%

## Dichloro-[1,1'-bis-(diphenylphosphino)-ferrocen]-palladium(II)



**Pd(dppf)Cl<sub>2</sub>**  
CAS 72287-26-4  
13.5–15.5% Pd  
Purity >97%

## Dichloro-bis-(di-tert-butyl-(4-dimethylaminophenyl)-phosphine)-palladium(II)



**Pd(Amphos)<sub>2</sub>Cl<sub>2</sub>**  
CAS 887919-35-9  
14.0–16.0% Pd  
Purity >97%

## Dichloro-bis-(tri-*o*-tolylphosphine)-palladium(II)



**Pd(P(*o*Tol))<sub>2</sub>Cl<sub>2</sub>**  
CAS 40691-33-6  
12.5–14.5% Pd  
Purity >97%

## Dichloro-bis-(tricyclohexylphosphine)-palladium(II)



**Pd(PCy<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>**  
CAS 29934-17-6  
13.4–15.4% Pd  
Purity >97%

## YOUR PALLADIUM PHOSPHINE CATALYST OF CHOICE

Upon request, we can provide many  
other palladium phosphine catalysts  
of your choice.

## ADVANTAGES OF WORKING WITH HERAEUS

**Global Presence** – Benefit from logistics and personal contacts in every region of the world

**From Sample Sizes to Bulk Manufacturing** – Guaranteed highest product quality no matter the size

**Trading & Recycling** – Finance your precious metals and reuse it through our recycling services

**Expert for all Precious Metals Compounds** – Take advantage of a broad product portfolio

# ABOUT HERAEUS PRECIOUS METALS

Heraeus Precious Metals is a leading provider of precious metals services and products. We combine all activities related to our comprehensive expertise in the precious metals loop – from trading to precious metals products to recycling.

Heraeus Precious Metals is one of the world's largest refiners of platinum group metals (PGMs) and a leading name in industrial precious metals trading. Our precious metals products are used in a wide variety of industries,

including the chemical, pharmaceutical, glass, electronics and automotive industries. We offer top quality solutions and products based on many years of experience and technical expertise. We are a reliable development partner for our customers and find the best solutions for their requirements.

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