

## Chemical Products

Heraeus' Chemical Products business unit covers a comprehensive range of precious metal catalysts and precursors for homogeneous catalysis on a commercial scale, such as:

Ir	Di- $\mu$ -chloro-bis[(cycloocta-1,5-diene)iridium(I)]	$[\{\text{Ir}(\text{cod})\}_2(\mu\text{-Cl})_2]$
Pd	Bis(acetonitrile)dichloropalladium(II)	$[\text{PdCl}_2(\text{CH}_3\text{CN})_2]$
	Bis(acetylacetonato)palladium(II) ("Palladium Acetylacetonate")	$[\text{Pd}(\text{acac})_2]$
	Bis(dibenzylideneacetone)palladium(0)	$\text{Pd}(\text{dba})_2$
	Dichlorobis(triphenylphosphane)palladium(II)	$[\text{PdCl}_2(\text{PPh}_3)_2]$
	Dichloro(cycloocta-1,5-diene)palladium(II)	$[\text{PdCl}_2(\text{cod})]$
	Dichloro[1,1'-ferrocenylbis(diphenylphosphane)]palladium(II) dichloromethane	$[\text{PdCl}_2(\text{dppf})\cdot\text{CH}_2\text{Cl}_2]$
	Palladium(II) acetate	$\text{Pd}(\text{OAc})_2$
	Tetrakis(triphenylphosphane)palladium(0)	$[\text{Pd}(\text{PPh}_3)_4]$
	Pt	cis-Dichlorobis(triphenylphosphane)platinum(II)
Di- $\mu$ -chloro-bis[chloro(cyclohexene)platinum(II)]		$[\{\text{PtCl}(\text{C}_6\text{H}_{10})\}_2(\mu\text{-Cl})_2]$
Dichloro(cycloocta-1,5-diene)platinum(II)		$[\text{PtCl}_2(\text{cod})]$
	Platinum(0) divinyltetramethyldisiloxane complex; "Karstedt Concentrate"	" $[\text{Pt}_2(\text{C}_8\text{H}_{18}\text{OSi}_2)_3]$ "
Rh	(Acetylacetonato)carbonyl(triphenyl-phosphane)rhodium(I); "ROPAC"	$[\text{Rh}(\text{acac})(\text{CO})(\text{PPh}_3)]$
	(Acetylacetonato)(cycloocta-1,5-diene)rhodium(I)	$[\text{Rh}(\text{acac})(\text{cod})]$
	(Acetylacetonato)dicarbonylrhodium(I) "CARAC"	$[\text{Rh}(\text{acac})(\text{CO})_2]$
	Bis(cycloocta-1,5-diene)rhodium(I) tetrafluoroborate	$[\text{Rh}(\text{cod})_2]\text{BF}_4$
	Chlorotris(triphenylphosphane)rhodium(I); "Wilkinson's Catalyst"	$[\text{RhCl}(\text{PPh}_3)_3]$
	Di- $\mu$ -chloro-bis[chloro(pentamethylcyclopentadienyl)rhodium(III)]	$[\{\text{RhClCp}^*\}_2(\mu\text{-Cl})_2]$
	Di- $\mu$ -chloro-bis[(cycloocta-1,5-diene)rhodium(I)]	$[\{\text{Rh}(\text{cod})\}_2(\mu\text{-Cl})_2]$
	Rhodium acetate	" $\text{Rh}(\text{OAc})_x$ "
	Rhodium acetate <i>acetic solution</i>	" $\text{Rh}(\text{OAc})_x$ "
	Rhodium 2-ethylhexanoate; solution in 2-ethyl hexanol; "Rh 2-EH"	" $\text{Rh}_2(\text{C}_8\text{H}_{15}\text{O}_2)_4$ "
Rhodium(III) iodide	$\text{RhI}_3$	
Ru	Carbonyldihydrido-tris(triphenylphosphane)ruthenium(II)	$[\text{Ru}(\text{H})_2(\text{CO})(\text{PPh}_3)_3]$
	Di- $\mu$ -chloro-bis[chloro(p-cymene)ruthenium(II)]	$[\{\text{RuCl}(\text{C}_{10}\text{H}_{14})\}_2(\mu\text{-Cl})_2]$
	Dichloro(cycloocta-1,5-diene)ruthenium(II)	$[\text{RuCl}_2(\text{cod})]_n$
	Dichlorotris(triphenylphosphane)ruthenium(II)	$[\text{RuCl}_2(\text{PPh}_3)_3]$
	Tris(acetylacetonato)ruthenium(III) "Ruthenium Acetylacetonate"	$[\text{Ru}(\text{acac})_3]$

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**Heraeus' Chemical Products – Long-Term Reliability and Real Partnership!**

## Precious Metal Refining— High Quality through modern Equipment



Thermal treatment at Wartburg/TN

Thermal reduction is an important step in the treatment of Precious Metals containing material. This process ensures the drying of material and the increase of precious metals concentrations and is therefore an essential foundation for the homogenization and sampling of material.

Especially spent heterogeneous and homogeneous catalysts such as carbon-catalysts, resins and sludges as well as precious metals containing items from the Electronics, Glass- or decorative coating industries are treated in this way.

Heraeus has recently invested into capacity expansion at the facilities in Hanau / Germany and Wartburg / Tennessee and has significantly increased the range of treatable materials. In Hanau we have commissioned the HeraCYCLE® process for thermal processing.

This process is focused on the treatment of organic containing catalysts with high burning points originating out

of the chemical, petrochemical or pharmaceutical industries.

The technology used in this robust unit is based on our substantial experience in the treatment of precious metals and is designed to facilitate treatment of materials with more and more complex and ever changing matrices.

We can ensure a professional treatment of all intake materials regardless of their consistency.

This state of the art process meets all regulatory standards and has been permitted without problems.

All material is treated in a batch process ensuring that each customer lot is treated separately and the contained precious metals can be balanced correctly.

Heraeus is ready to convert your recovered metal into the precious metal compounds and homogeneous catalysts you need for your process.

HeraCYCLE®: A highly flexible and robust technology for thermal treatment of refining materials



**HeraCYCLE® closes the loop in homogeneous catalysis...**