

let's co  
create

Advanced catalyst technologies for  
efficient cross-coupling reactions

*materials for a better life*

**umicore**  
Precious Metals Chemistry

# Innovative homogeneous cross-coupling catalysts from research to commercial scale

Cross-coupling reactions are one of the most elegant and versatile synthetic methods to prepare agrochemicals, electronics, fine chemicals and pharmaceuticals.

At Umicore Precious Metals Chemistry, we offer a selection of highly active catalysts and precatalysts that excel at cross-coupling reactions. We provide unparalleled access to outstanding proprietary, patent-protected technologies that support customers with an expansive portfolio of cutting-edge homogeneous catalysts and service offerings.

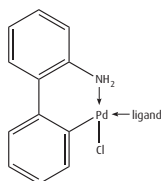


# Providing scientists with full access to an outstanding proprietary, patent-protected homogenous catalysis technology

Developed to overcome the challenges associated with *in situ* catalyst formation, air and moisture stable Buchwald and Hazari precatalysts can be applied to a wide range of challenging cross-coupling reactions.

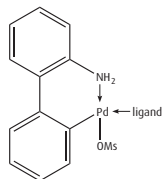
Umicore Precious Metals Chemistry now offers a selection of Hazari palladium-based precatalysts. This includes Umicore CX200, Hazari's unligated dimeric catalyst, which offers fast and sophisticated *in situ* ligand screening to identify the most efficient metal-ligand complex.

## Buchwald 2nd Generation Palladacycles<sup>1</sup>



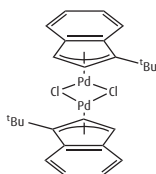
Trade name	Empirical formula	Cas no	QR Code
Umicore CX121	Pd(SPhos)G2	1375325-64-6	
Umicore CX122	Pd(XPhos)G2	1310584-14-5	
Umicore CX123	Pd(RuPhos)G2	1375325-68-0	

## Buchwald 3rd Generation Palladacycles<sup>1</sup>

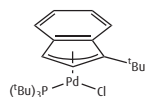


Umicore CX131	Pd(SPhos)G3	1445085-82-4	
Umicore CX132	Pd(XPhos)G3	1445085-55-1	
Umicore CX133	Pd(RuPhos)G3	1445085-77-7	
Umicore CX135	Pd( <sup>t</sup> BuXPhos)G3	1447963-75-8	
Umicore CX136	Pd(Xantphos)G3	1445085-97-1	

## Hazari Palladacycles<sup>2</sup>



Umicore CX200 [Pd(1-<sup>t</sup>Bu-Ind)Cl]<sub>2</sub> 1779569-01-5



Umicore CX201 [Pd(1-<sup>t</sup>Bu-Ind)(P(<sup>t</sup>Bu)<sub>3</sub>)Cl] 1779569-15-1



1 Buchwald Palladacycles are proprietary catalysts. Umicore has been granted a worldwide license from M.I.T. (Massachusetts Institute of Technology) with rights to sub-license to their customers for their applications.

2 Hazari Palladacycles are proprietary catalysts. Umicore has been granted a worldwide license from Yale University with rights to sub-license to their customers for their applications.

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To learn more about our cross-coupling offerings,  
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