



*Your partner in catalysis*

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# Innovative homogeneous & supported catalysts

## NOVECAT catalysts

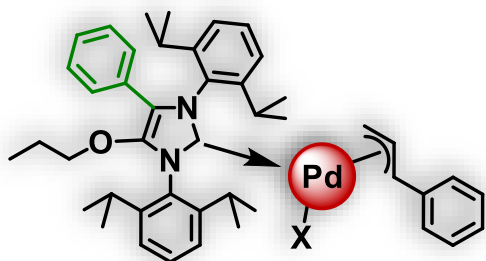
- ✓ High performance & low leaching
- ✓ Easy Pd recovery & recycling
- ✓ Air stable & easy to handle
- ✓ Wide solvent compatibility
- ✓ Aryl chlorides & bromides
- ✓ Economical & ecological benefits

106.42 Atomic mass	46 Atomic number
<b>Pd</b> Palladium	
804.4 First ionization energy	2.20 Electronegativity

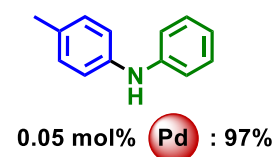
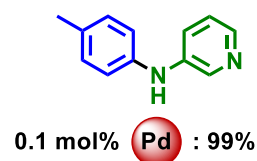
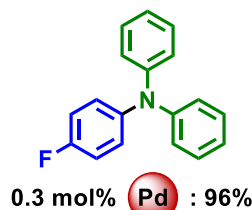
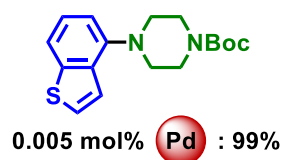
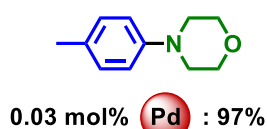
Excellent choice for industrial applications

## Homogeneous catalysts for C-C and C-N couplings

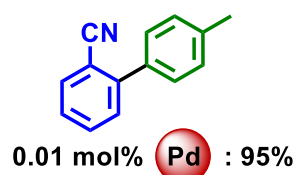
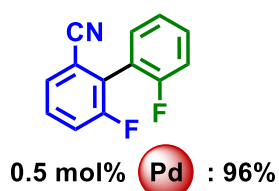
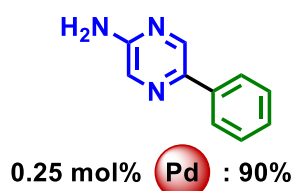
### NOVECAT® G4 family



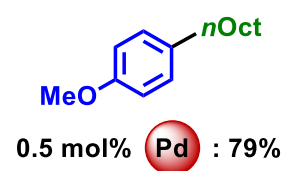
### Buchwald C-N couplings



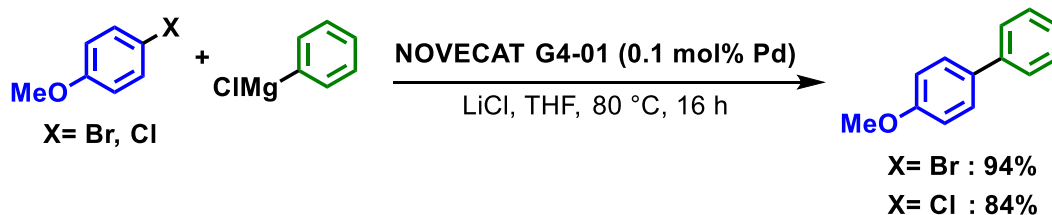
### Suzuki coupling



### Negishi coupling



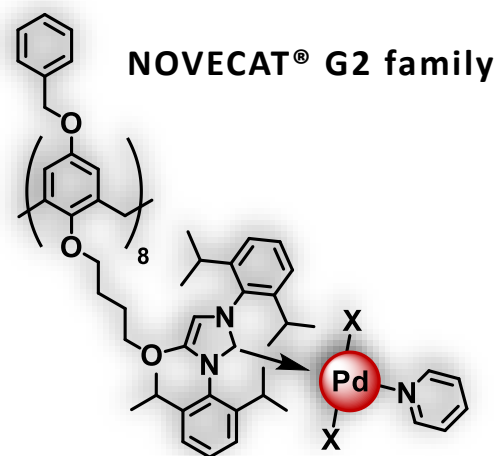
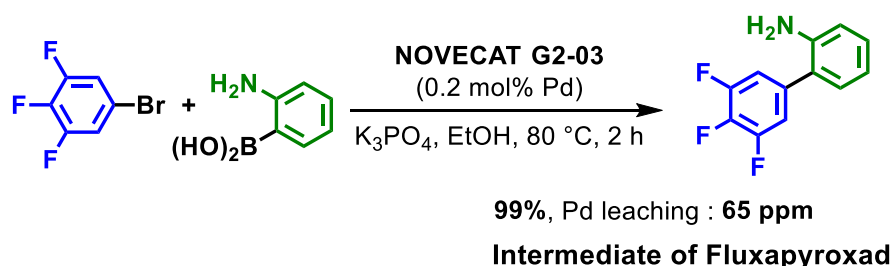
### Kumada C-C couplings



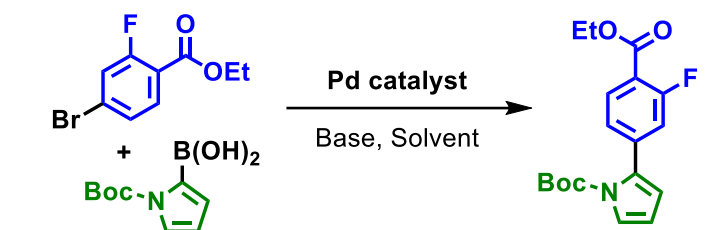
# The most efficient supported catalysts on the market

## Suzuki C-C coupling

### Preparation of API's



### Performance comparison with other Pd catalytic systems

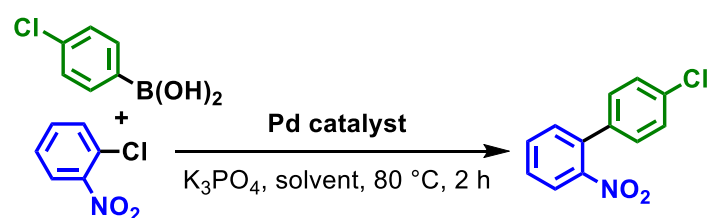


0.5 mol% NOVECAT G2 : 89% (Pd leaching : 14 ppm)

0.5 mol% Pd(OAc)<sub>2</sub>/XPhos : 91% (Pd leaching : 476 ppm)

0.5 mol% Pd(dtbpf)Cl<sub>2</sub> : 96% (Pd leaching : 459 ppm)

complex arylpyrrole core



0.5 mol% NOVECAT G2-01 : 88% (Pd leaching : 31 ppm)

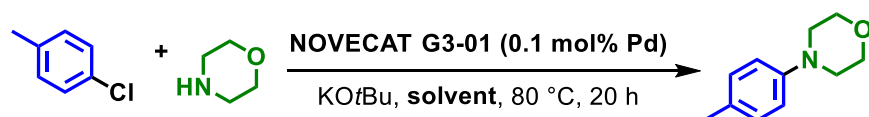
0.5 mol% Pd(OAc)<sub>2</sub>/XPhos : 88% (Pd leaching : 1450 ppm)

1 mol% Pd(PPh<sub>3</sub>)<sub>4</sub> : 29%

Boscalid main intermediate

1) Dalton Trans. 2018, 47, 13843; 2) React. Chem. Eng. 2020, 5, 1509; 3) Adv. Synth. Catal. 2022, 364, 947.

## Buchwald C-N coupling

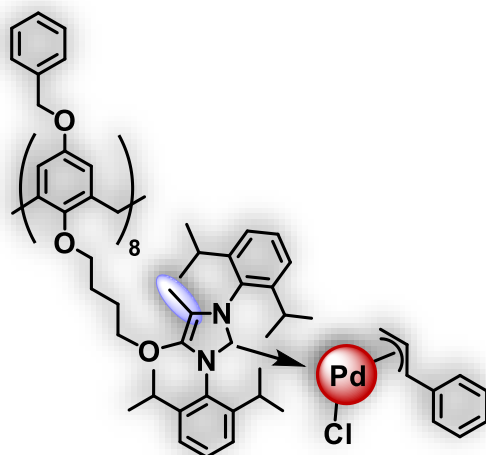


### Wide solvent compatibility

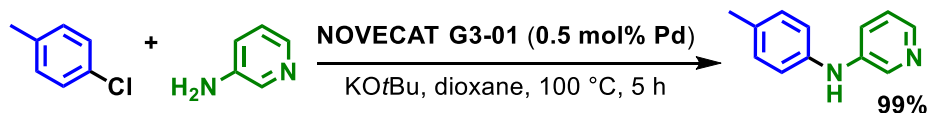
99% in MeTHF (Pd leaching : 24 ppm)  
99% in dioxane (Pd leaching : 25 ppm)  
93% in CPME (Pd leaching : 38 ppm)  
99% in toluene\* (Pd leaching : 43 ppm)  
97% in MeCy\* (Pd leaching : 9 ppm)

\* 0.2 mol% Pd was used

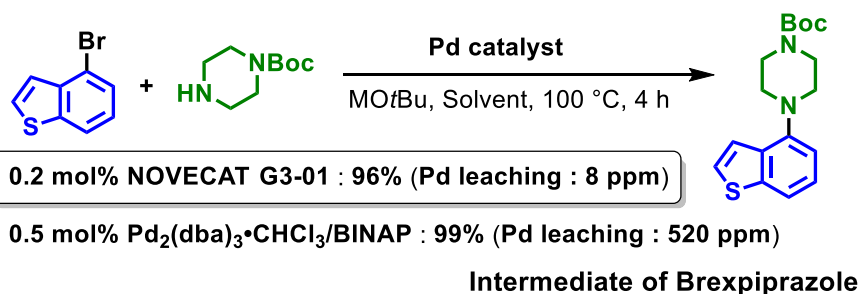
### NOVECAT® G3 family



### Performant with strong chelating amines



### Preparation of API's



NOVECAT Pd-NHC catalysts for Buchwald: Catal. Sci. Technol. 2021, 11, 5223.

# Catalysis expertise and services

## Reactions setup and optimization

- Wide range of catalytic reactions: cross-couplings, hydrogenation, C-H activation, asymmetric catalysis...
- Parameters optimization (catalyst, base, solvent, temperature...)
- HTE fast screening
- Flow chemistry (process design & optimization)

## Metal removal

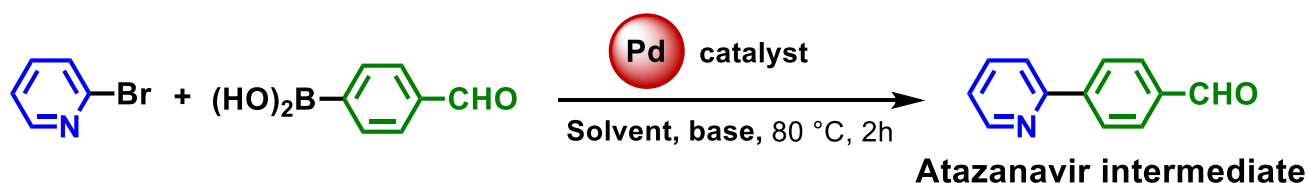
- Metal leaching analysis
- Decontamination solutions

## Development and batches production

- From 100 mg to 1 kg
- Product purification & analysis
- Cost optimization (in compliance with regulations)

We optimize your catalysis operations, you save time and money

## High Throughput Experimentation

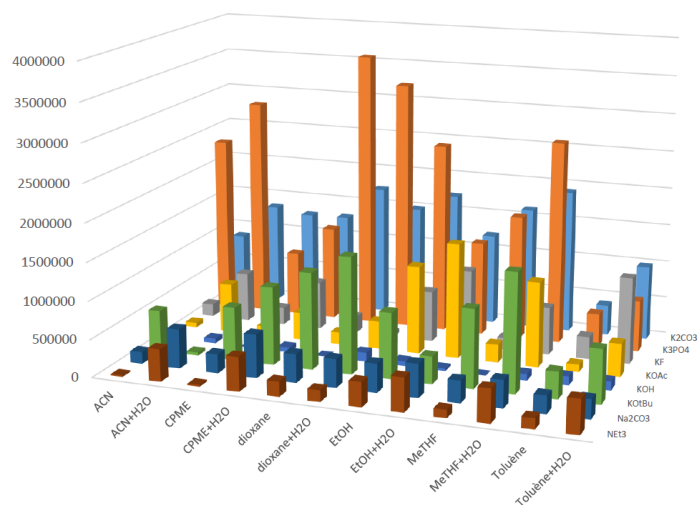


### Various reactions

- Catalysis, organocatalysis, organic synthesis

### Fast screening

- Catalysts, reagents, solvents, bases...



HTE: the perfect tool for fine optimization