

# Pd EnCat™

## Encapsulated palladium catalysts

Reaxa's Pd EnCat™ catalysts incorporate palladium(II) acetate and activating ligands within a porous polymer bead giving low levels of precious metal contamination in coupling reactions

Contaminated crude Suzuki coupling product made with homogeneous Pd acetate catalyst system



Cleaner product made using Pd EnCat™ 30 catalyst with no extra purification

Cleaner products

Cleaner waste streams

Fast, efficient processes

No plant contamination

Improved processes

Process intensification

typically less than 10 ppm Pd in crude reaction products

minimal metal losses in Pd EnCat™ processes

EnCat™ beads filter easily

metal and ligands remain trapped within the polymer bead

high activity in many types of coupling reactions

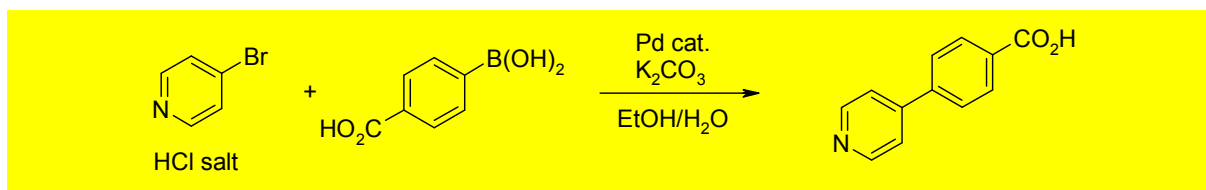
EnCat™ can be used in batch and continuous flow processes

| Product             | Pd content % w/w | Co-encapsulated ligand |
|---------------------|------------------|------------------------|
| Pd EnCat™ 30        | 4.3              | None                   |
| Pd EnCat™ 40        | 4.6              | None                   |
| Pd EnCat™ TPP30     | 4.7              |                        |
| Pd EnCat™ TOTP30    | 4.7              |                        |
| Pd EnCat™ BINAP30   | 4.7              |                        |
| Pd EnCat™ polyTPP30 | 4.6              |                        |

# Pd EnCat™

## Applications

### AstraZeneca pilot plant process (courtesy Dr A Wells)



Homogeneous process:  
0.4 - 1.0 mol% Pd (PPh<sub>3</sub>)<sub>4</sub>

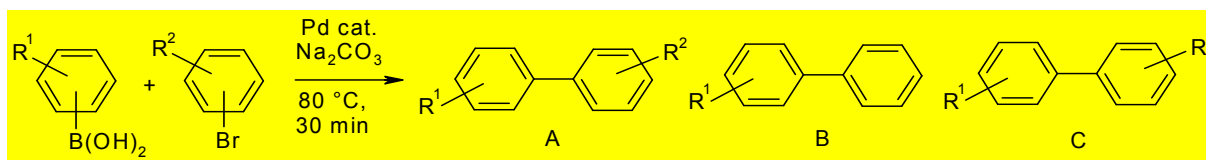
EnCat™ process:  
0.75 mol% Pd EnCat™ 40 + 2.5 mol% PPh<sub>3</sub>

- 80-90% yield
- 600 ppm Pd in crude product and waste stream
- Target <100ppm
- Catalyst recycling not possible



- 85% yield
- No reaction in the absence of PPh<sub>3</sub>
- Reuse >3 times without loss of activity
- 20 ppm Pd in waste stream

### Fine chemicals scale-up - Suzuki process to target compound A



| Catalyst     |           | % Yield A | % Yield B | % Yield C | Pd (ppm) in crude product |
|--------------|-----------|-----------|-----------|-----------|---------------------------|
| 5% Pd/C      | 2.5 mol%  | 87        | 13        | 0         | 56                        |
| Pd EnCat™ 30 | 2.5 mol%  | 97        | <1        | <1        | 14                        |
| Pd EnCat™ 30 | 0.25 mol% | >99       | <1        | <1        | 9                         |

For more information about EnCat™ catalysts please visit: [www.reaxa.com/encat](http://www.reaxa.com/encat)  
For EnCat™ samples and test kits please visit: [www.reaxa.com/samples](http://www.reaxa.com/samples)  
For bulk quotations on EnCat™ products contact: [info@reaxa.com](mailto:info@reaxa.com)

