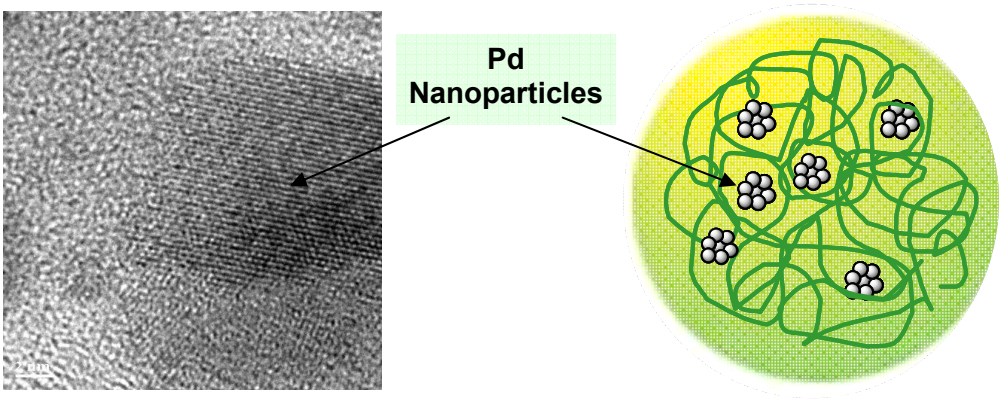
Pd(0) EnCat™

Encapsulated palladium(0) catalyst

Reaxa's Pd(0) EnCat™ catalyst incorporates palladium(0) nano-particles within a porous polymer bead giving high selectivity with low levels of precious metal contamination in reduction reactions



Cleaner products	**typically less than 10 ppm Pd in crude reaction products**
Cleaner waste streams	**minimal metal losses in Pd EnCat™ processes**
Fast, efficient processes	**EnCat™ beads filter easily**
No plant contamination	**metal remains trapped within the polymer bead**
Improved processes	**high activity and selectivity in many types of reduction reactions**
Process intensification	**EnCat™ can be used in batch and continuous flow processes**

Product	*Pd Metal Content % w/w*	*Pd Loading mmol/g*	*Particle Size Range µm (average)*
Pd(0) EnCat™ 30NP	**4.3**	**0.35-0.45**	**100-350 (200)**

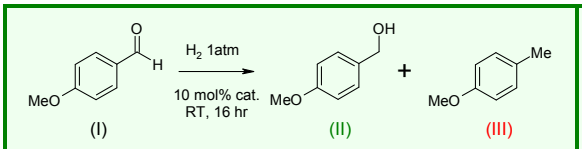
Reaxa's controlled manufacturing process produces regular palladium(0) nanoparticles stabilised by the polymer matrix of the EnCat™ beads, ensuring that the catalyst performance is extremely reproducible from batch to batch. Each metal particle is around 2 nm in diameter, approximately 10 atoms, giving a highly selective & active hydrogenation catalyst. The polymer matrix also helps stabilise the catalyst in air improving the safety profile compared with alternative palladium on carbon products.

Pd(0) EnCat™ 30NP is effective for the reduction of a wide variety of substrates, in each case affording extremely low levels of palladium contamination of the resulting products.

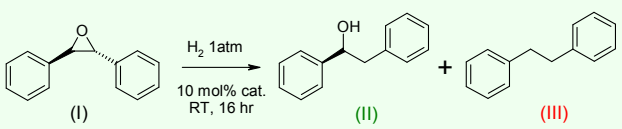
Pd(0) EnCat™

Applications

Highly Selective Hydrogenations:

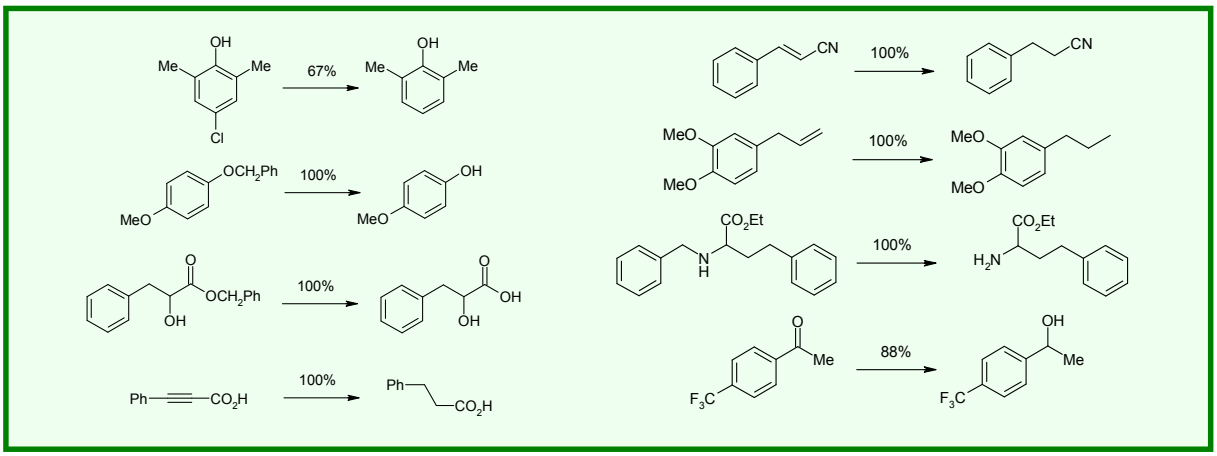


Pd(0) EnCat™ 30NP: 95% (II) 5% Pd/C: 100% (III)



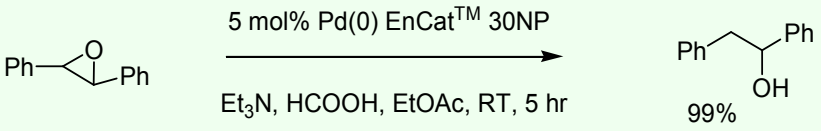
Pd(0) EnCat™ 30NP: 93% (II) 5% Pd/C: 100% (III)

Reduction Examples:



General conditions: H_2 (1 atm), 10 mol% Pd(0) EnCat™ 30NP, EtOH, RT, 16 h

Example of Pd(0) EnCat™ recycling:



Run	1	2	3	4	5	6	7	8	9	10
Time (h)	5	3	3	3	5	3	5	5	5	5
Yield (%)	99	91	76	96	92	93	98	97	97	92

Selected References:

N. Bremeyer, S.V. Ley, C. Ramarao, I.M. Shirley, S.C. Smith; *Synlett.*, **2002**, *11*, 1843.
J-Q.Yu; H-C.Wu, C. Ramarao, J.B. Spencer, S.V. Ley; *Chem. Comm.,* **2003**, 678.
S.V. Ley, C. Mitchell, D. Pears, C. Ramarao, J-Q. Yu, W. Zhou; *Org. Lett.,* **2003,** *5*, 4665.

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

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