

# Os EnCat™ 40

## Encapsulated Osmium Tetroxide Catalyst

Reaxa's Os EnCat™ 40 catalyst immobilises osmium tetroxide within a robust porous polyurea matrix for safer handling allowing easier, faster and cleaner processes to be developed



Osmium tetroxide is known to be one of the most reliable and effective catalysts for oxidative cleavage and dihydroxylation of olefins. However, it is very toxic, volatile and expensive which limits its use particularly at large-scale. Os EnCat™ 40, produced by Reaxa's microencapsulation technology, effectively immobilises and stabilises osmium tetroxide to produce a safer and easier to use catalyst for use in oxidation chemistry.

In the picture, a sample of Os EnCat™ 40 is unchanged, whereas an equivalent sample of volatile osmium tetroxide quickly reacts to produce black decomposition products.

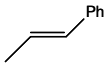
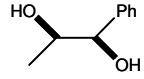
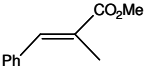
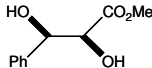
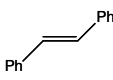
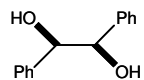
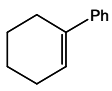
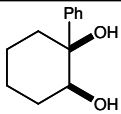

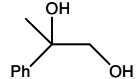
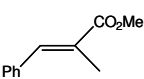
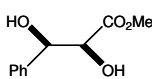
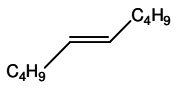
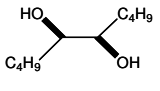
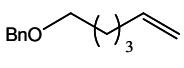
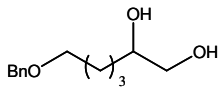
<b>Cleaner products</b>	typically less than 100 ppm Os in crude product
<b>Easier storage, transport &amp; use</b>	low residual OsO <sub>4</sub> vapour over Os EnCat™ product
<b>Faster, efficient processes</b>	the Os EnCat™ 40 beads filter easily
<b>Reduced plant contamination</b>	OsO <sub>4</sub> is trapped in the beads
<b>Improved cost effectiveness</b>	Os EnCat™ 40 may be reused in repeat reaction cycles
<b>Process intensification</b>	can be used in batch & flow processes

<i>Product</i>	<i>Os Metal Content w/w %</i>	<i>OsO<sub>4</sub> Loading mmol/g</i>	<i>Particle Size Range µm (average)</i>
<b>Os EnCat™ 40</b>	<b>4.8 - 5.7</b>	<b>0.25 - 0.30</b>	<b>40 - 300 (165)</b>



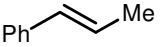
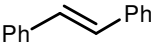
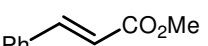
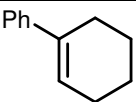
# Os EnCat™ 40 Applications

## Dihydroxylation Reactions:

Substrate	Product	Yield (%)	Substrate	Product	Yield (%)
		80			83
		84			82
		90			85
		84			73

Olefin (1 mmol), NMO (1.3 mmol), 5 mol% Os EnCat™40, acetone/water, room temp., 12-20 h

## Asymmetric Dihydroxylation Reactions:

Substrate	Yield (%)	ee (%)
	98	94
	88	>99
	94	>99
	91	97

5 mol% Os EnCat™ 40/(DHQD)<sub>2</sub>PHAL, MeSO<sub>2</sub>NH<sub>2</sub>, K<sub>3</sub>Fe(CN)<sub>6</sub>, K<sub>2</sub>CO<sub>3</sub>, THF/water, room temp., 24-48 h

## Selected References:

1. Oxidative Cleavage of Olefins. B. Borhan *et al.*, *Tetrahedron Lett.*, 2006, 3797.
2. Dihydroxylation Reactions. S.V. Ley *et al.*, *Org. Lett.*, 2003, 5, 185.
3. Asymmetric Dihydroxylations. S. V. Ley *et al.*, *Org. Biomol. Chem.*, 2003, 1, 3957.

R&D quantities of Os EnCat™ 40 are available from Sigma-Aldrich at:  
[www.sigma-aldrich.com](http://www.sigma-aldrich.com)

For technical support, bulk quotations & information on Os EnCat™ 40 please contact:  
[info@reaxa.com](mailto:info@reaxa.com)

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