

# Reduction

HAMARI CHEMICALS LTD.

## Catalysts & Reagents

Pd-C, Raney Ni

Pt-C, Rh-Alumina SBH, DIBAH

LAH, Red-Al

## Autoclaves

> 10L ~ 1800L (SS) max. 140psi (0.96MPa)  
Total 10 autoclaves

> 500L (SS) max. 990psi (6.8Mpa)

> 500L (Hastelloy) max. 140psi (0.96Mpa)

500L (SS)  
Mmax.990psi  
(6.8Mpa))



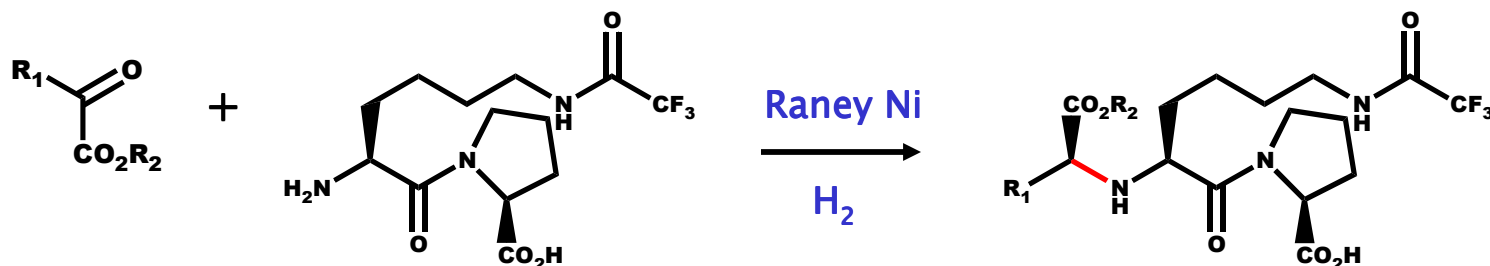
500L (Hastelloy)  
Max.140psi (0.96Mpa)  
Using acid Condition



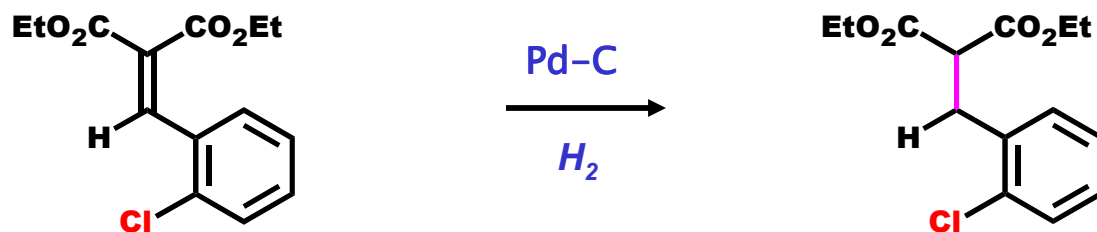
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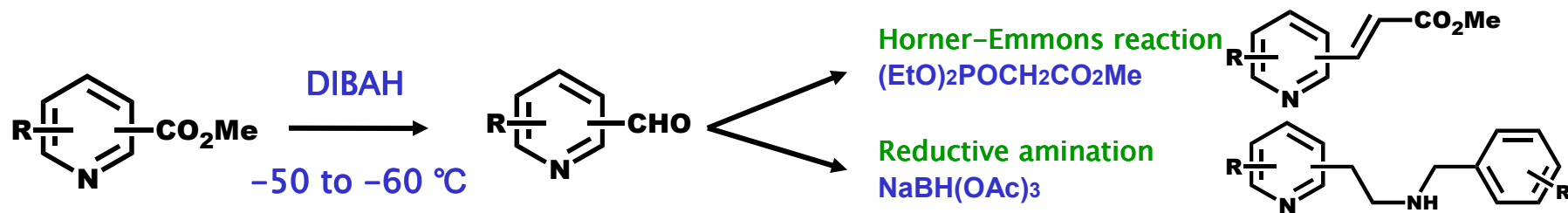
## Asymmetric Schiff base reduction ( $H_2$ / Raney Ni , 30 tons / year)



## Selective hydrogenation by using Pd-C (without dehalogenation)



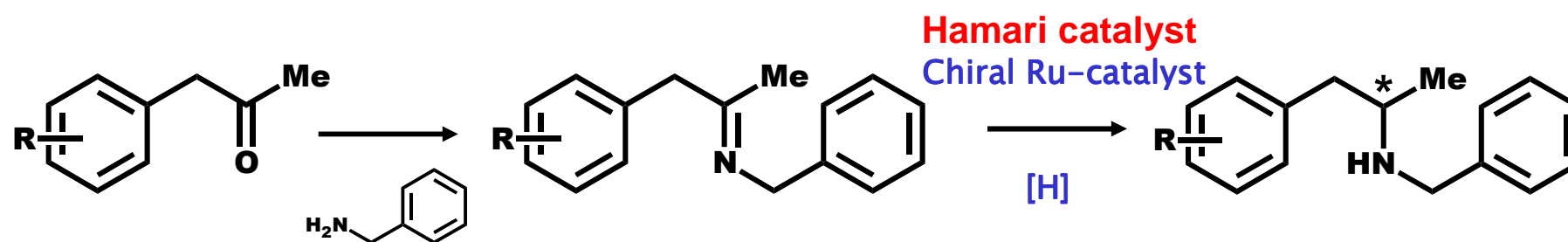
## Reduction with DIBAH on commercial scale



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## Asymmetric Transfer Hydrogenation using *Chiral Ru-catalyst*



| Chiral Ru-complex      | <i>ee</i> (%)        |
|------------------------|----------------------|
| arene-Ru(II)-TsDPEN    | ca.20% <i>ee</i>     |
| <b>Hamari catalyst</b> | <b>40% <i>ee</i></b> |

## Hamari Catalyst

