

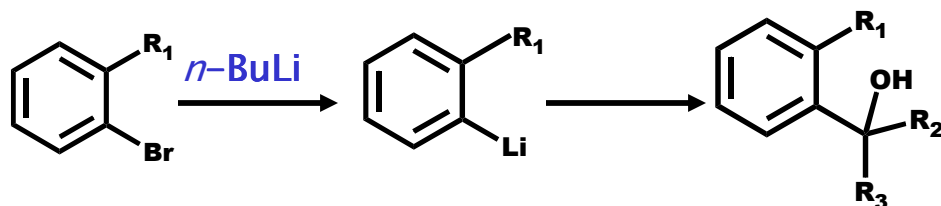
# Alkylation

HAMARI CHEMICALS LTD.

> Cryogenic reaction

~ -90°C MAX. 1000L  
~ -50°C MAX. 3000L

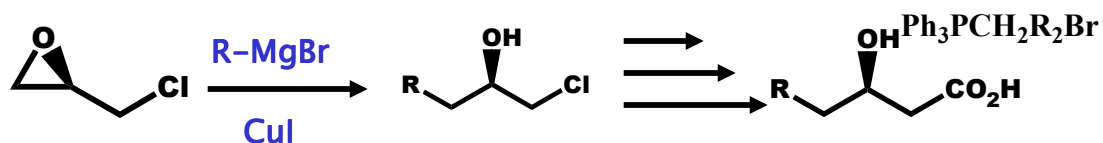
Alkyl lithium



Base

Alkyl lithium ( $n-BuLi$ ),  
LDA, NaH, *tert*-BuOK,  
*tert*-BuONa, MeONa,  
Li, *etc.*

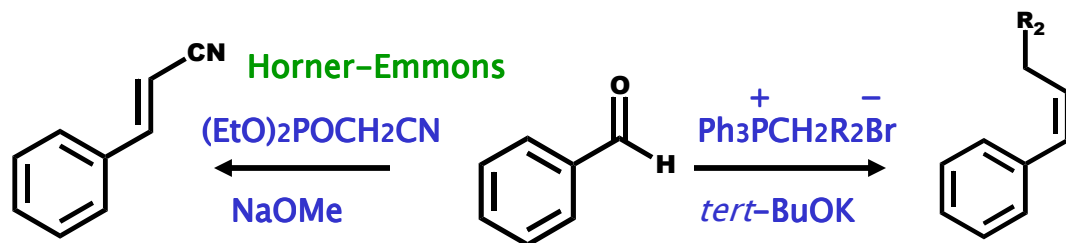
Grignard Reaction



Etherification

PTC-catalyzed (e.g. TBAB)  
Mild condition (<80° C)  
High yield (>90%)

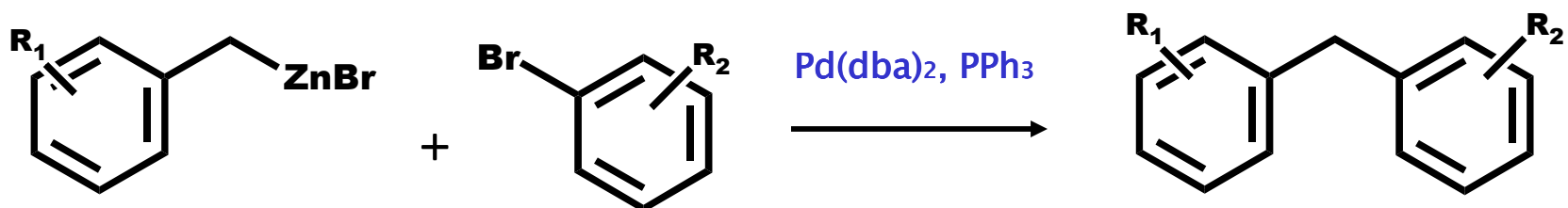
Olefination –Wittig and related reactions–



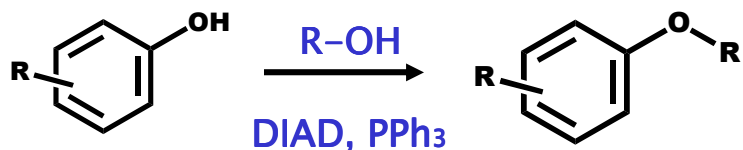
# Alkylation

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## > Negishi Cross Coupling with Pd-catalyst



- > **Suzuki Coupling** is achieved by same technology.
- > **Mitsunobu reaction** can perform using DIAD.



\* DIAD : Diisopropyl azodicarboxylate

## Manufacturing

- > **Pilot plant** (Hamari Osaksa)
- > **Capacity** - 50kg / Batch
- > Eliminate Pd down to **several ppb** level
- > In accordance with **c-GMP**