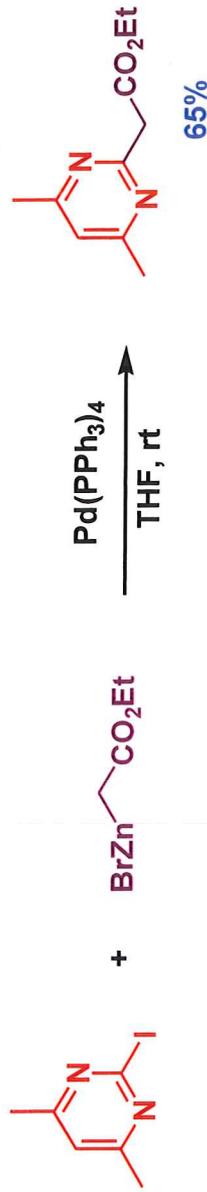
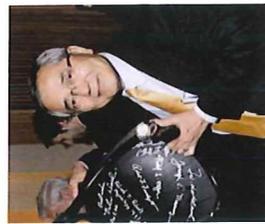


C-C bond formation – Negishi reaction



Usual catalysts:

$Pd(0) : Pd(PPh_3)_4;$

Ligands:

$PPh_3, P(o-tolyl)_3, dppe, dppf$

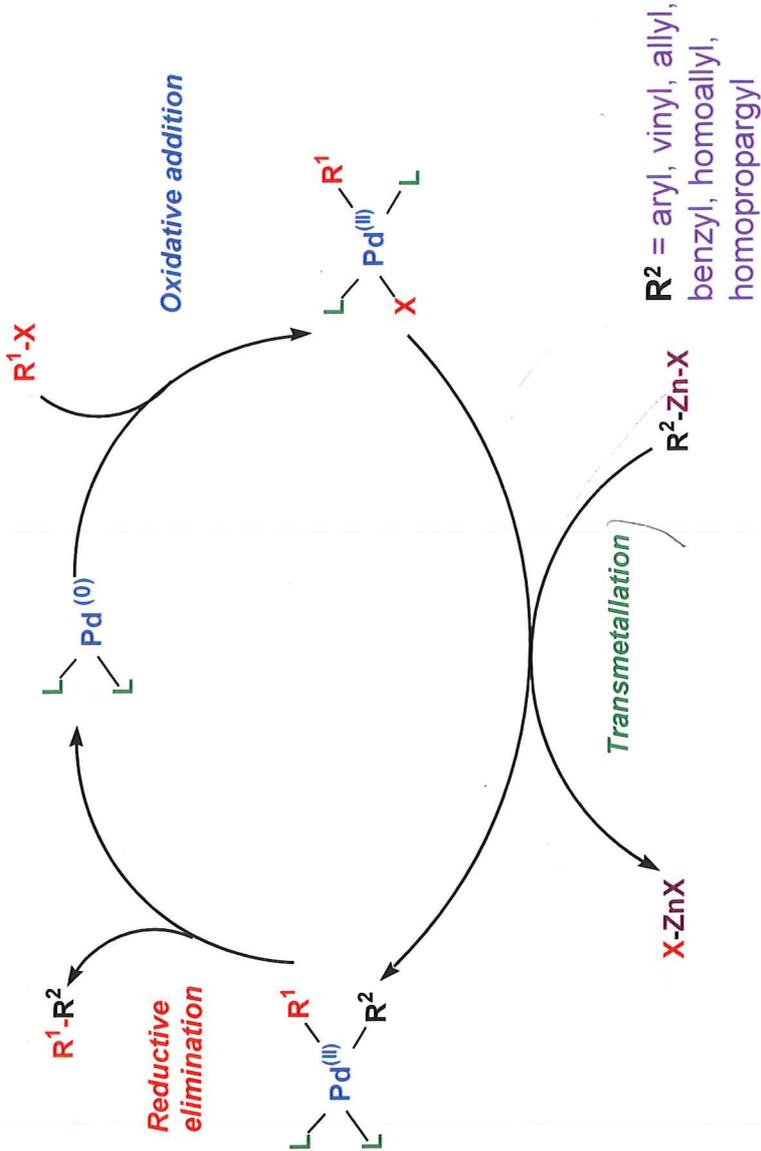
Advantages:

- Large panel of zinc derivatives
- Flexibility and FG
- Good yields
- Mild conditions
- Organozinc could be prepared *in situ*

Drawbacks

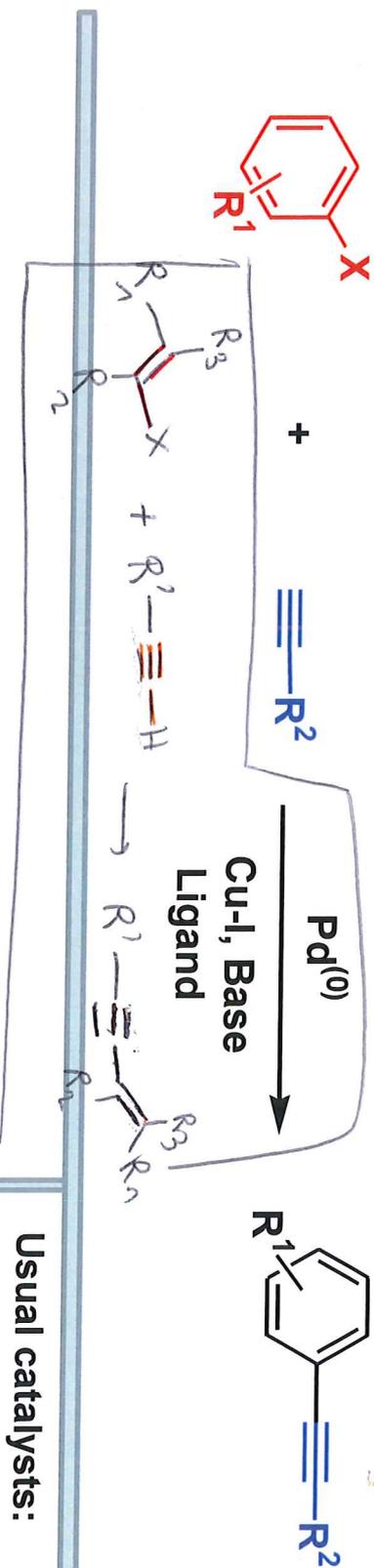
- Water sensitive reaction
- On large scales: difficulty to treat ZnX_2
- Use of $RMgX$ and $R-Li$ as precursors

$R^1 = \text{aryl, vinyl, alkynyl}$
 $X = I > Br > OTf > Cl$



Son CuL Bosou Est- um Skyle
 Sonogashira ↔ Cu B ↔ Suguki Son ↔ Skille

C-C bond formation – Sonogashira reaction



Usual catalysts:

$\text{Pd}(0) : \text{Pd}(\text{PPh}_3)_4;$

Ligands:

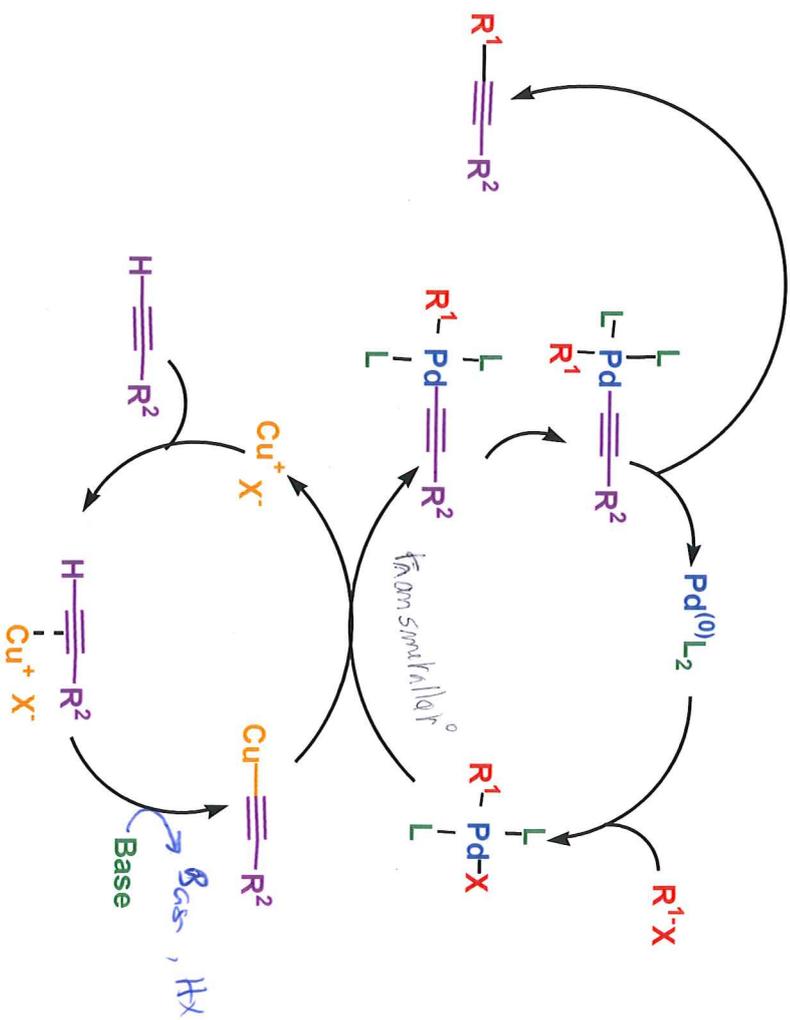
$\text{PPh}_3.$

Advantages:

- Access to internal alkynes
- After partial and selective reduction, access to alkenes with control of the E or Z configuration.
- Good yields and selectivities
- Reduced organometallic waste
- Compared to *Castro reaction*: Stoichiometric amount of Cu can be avoided

Drawback:

- Difficult to transpose on plant scales for safety reasons



Réaction de Heck

[k_n] $4d^{10}$

