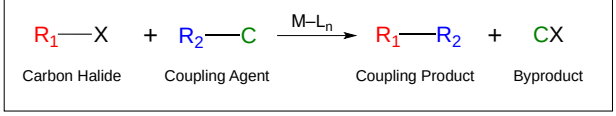
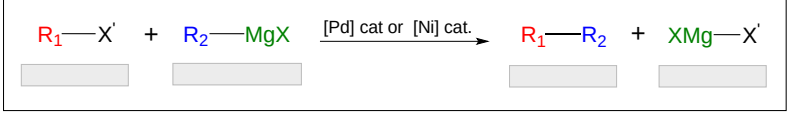
CONCEPT: KUMADA COUPLING

- The Kumada Coupling reaction involves the coupling between a carbon halide and Grignard Reagent.
  - □ The reaction uses a Pd or Ni catalyst in the formation of _____ or _____ products.
  - □ The use of a Pd or Ni catalyst allows for stereoselectivity with the Grignard reagent.

Cross-Coupling Reaction

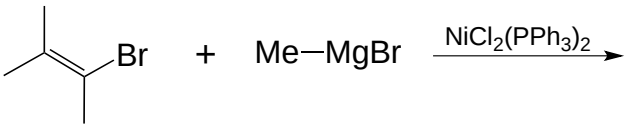


Kumada Coupling Reaction



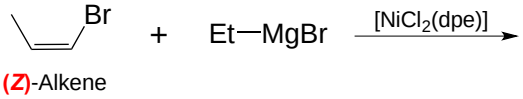
  - □ The **R1** group of the carbon halide is represented by a(n) *vinyl* or *aryl* group.
  - □ The **R2** group of the Grignard reagent is represented by a(n) *vinyl*, *aryl* + _____ group.
  - □ The **C** group = MgX with the **X** group represented by a(n) _____, _____ or _____.
  - □ The **X'** group of the carbon halide is represented by a(n) Cl, Br, I or OTf group.

EXAMPLE: Determine the product from the following Kumada Coupling Reaction.

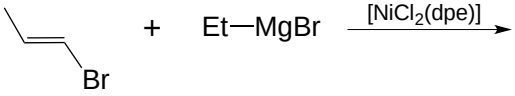


Stereoselectivity

- The stereochemistry of a vinyl halide is _____ when an alkyl Grignard reagent is used in the reaction.

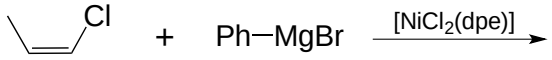


(*Z*)-Alkene



(*E*)-Alkene

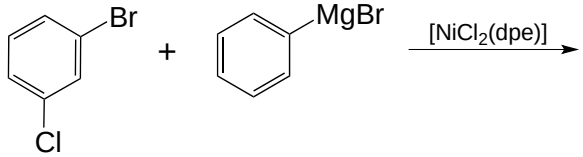
- A _____ of products are possible when a vinyl or aryl Grignard reagent is used in the reaction.



(*Z*)-Alkene

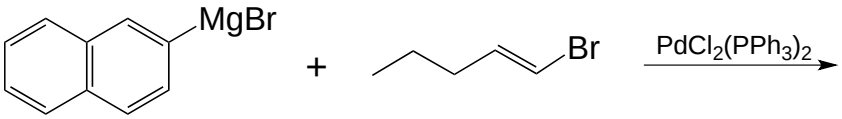
Chemoselectivity

- The Grignard reagent does not readily couple with aryl _____.



CONCEPT: KUMADA COUPLING

PRACTICE: Determine the product from the following Kumada Reaction.



PRACTICE: Determine the coupling product for the following Kumada reaction.