ORGANIC CHEMISTRY 2 LECTURE GUIDE 2019

BY RHETT C. SMITH, PH.D.

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Executive Editor: Rhett C. Smith, Ph.D. You can reach him through our office at:
IQ@protonguru.com

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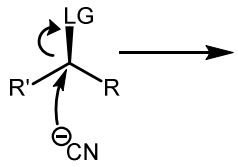
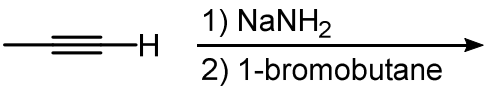
Lesson V.1. Introduction to Organometallics and Metal Hydrides

The need for nucleophilic carbon

In functional groups we studied previously (alcohols, ethers, and alkyl halides) carbon atoms are attacked by nucleophiles. We only know two examples in which a C has a negative charge on it and *acts as a nucleophile*:



A



B

Organometallic species feature a C–M bond, so that significant negative charge is on the C atom. This makes organometallic compounds a good source of nucleophilic carbon.

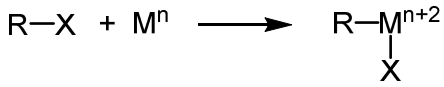
Notes

Lesson V.1. Introduction to Organometallics and Metal Hydrides

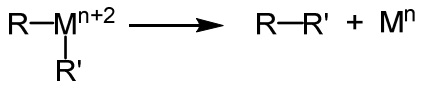
Oxidative addition and reductive elimination

We should preface our discussion of how organometallic species are prepared by learning a few of the elementary steps that occur between organic species and metals:

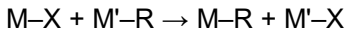
Oxidative addition:



Reductive elimination:



Transmetallation:



Ligand Exchange:

A

B

C

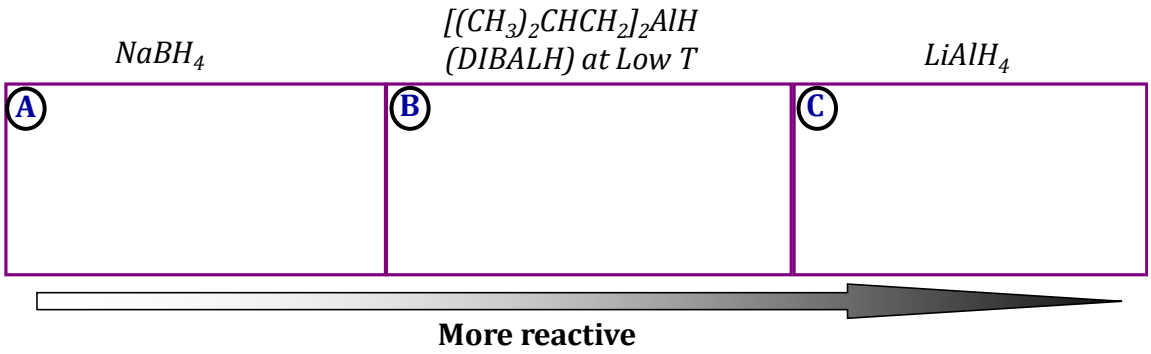
D

Notes

Lesson V.1. Introduction to Organometallics and Metal Hydrides

Metal hydrides have variable reactivity

Reagents that give H– as nucleophiles (H^- is called ***Hydride***)



We can predict the reactivity trend on the basis of charge, H-M bond polarity and steric bulk

Notes