

Chem 343 – Organic Reactions

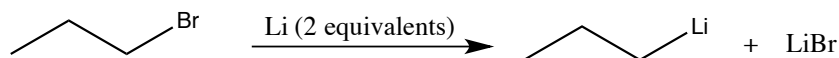
Chapter 9

Prepared by José Laboy, MS

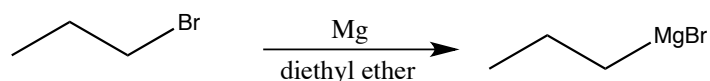
<http://www.chem.wisc.edu/areas/clc> (Resource page)

Organometallic Compounds

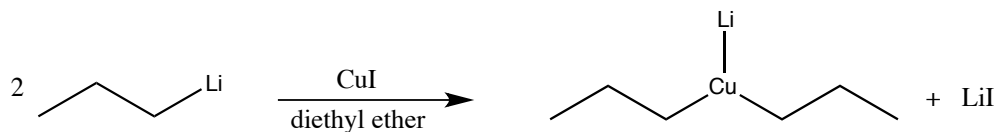
Organolithium Compounds



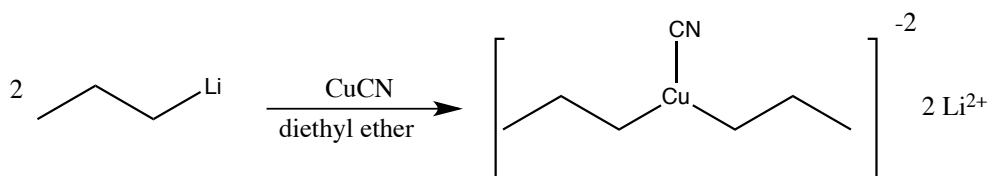
Organomagnesium Compounds (Grignard Reagents)



Lithium dialkyl cuprates (Gilman Reagents)



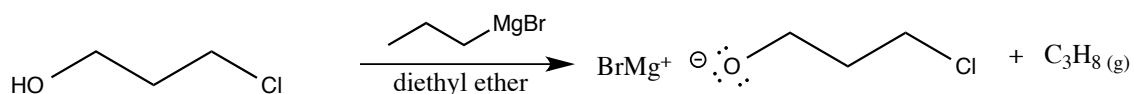
Lithium dialkyl cyano cuprates



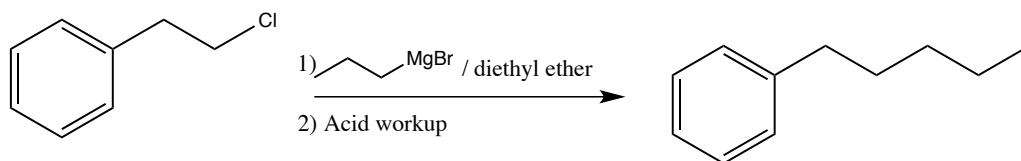
These organometallic reagents are used to make carbon-carbon bonds, that is, lengthening hydrocarbon chains.

Organolithium and Grignard reagents are **strong bases** and strong nucleophiles. Therefore the reacting reagent with organometallics should not have acidic groups, i.e., -OH, -NH₂, etc.

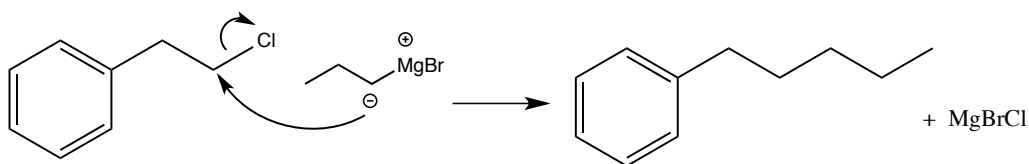
Example:



For these two reagents chains lengthening by S_N2 reaction mechanisms are the choice (see below). A second step, acid workup, which is a solution of a diluted acidic compound, is usually required to neutralize any un-protonated chemical species generated in the synthesis.

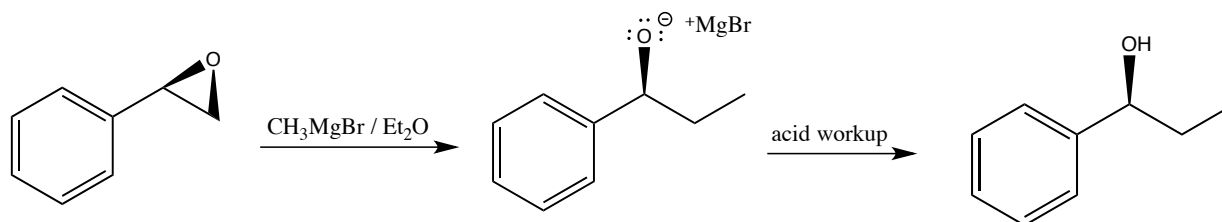


Mechanism

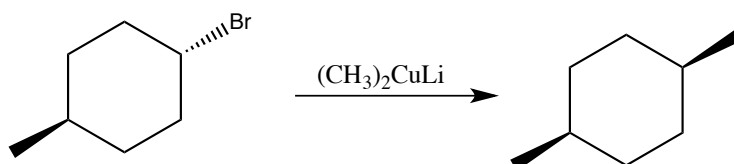


S_N2 mechanism

This is especially important when the reagent being added is an epoxide*. Notice that in the example shown below an alkoxide was generated when a Grignard reagent was used. To generate the respective alcohol the alkoxide is “washed” with a solution of dilute acid.



Gilman reagents, on the other hand, are weaker bases. They can be used with 2° alkyl halides.



* See Reaction of Epoxides with Organometallics.