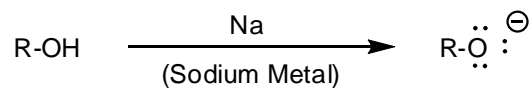


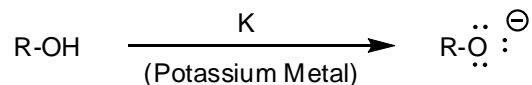
Synthesis of Alcohols

1. Formation of Alkoxides

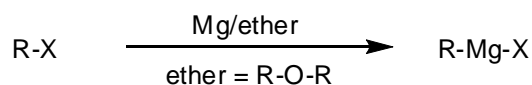
- Using sodium metal
 - Use for $1^\circ > 2^\circ$



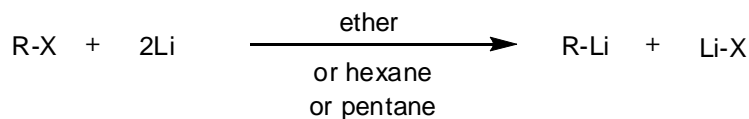
- Using potassium metal
 - Use for $3^\circ > 2^\circ$



2. Formation of Grignard reagent

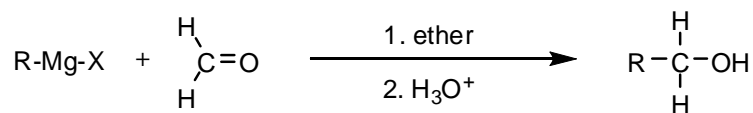


3. Formation of Organolithium reagents (similar to Grignard)

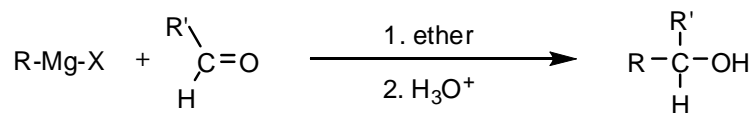


4. Grignard Reactions

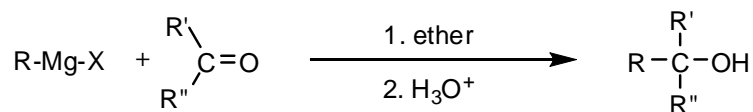
- Formation of primary alcohols



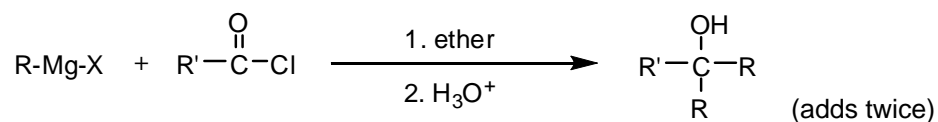
- Formation of secondary alcohols



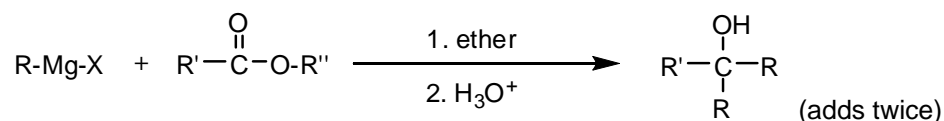
- Formation of tertiary alcohols



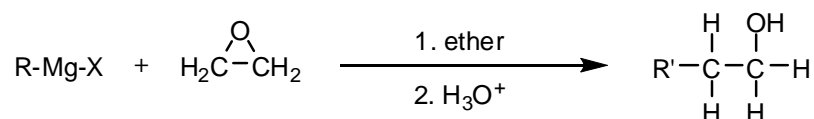
- Addition to Acid Chlorides: forms tertiary alcohols



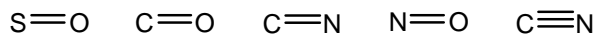
- Addition to Esters: forms tertiary alcohols



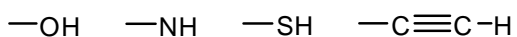
- Addition to Epoxides: forms primary alcohols



These are attacked by the Grignard reagent

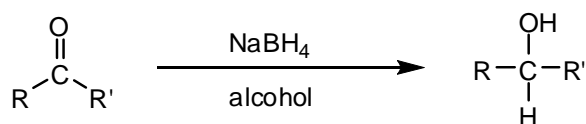


These protonate the Grignard reagent, destroying it

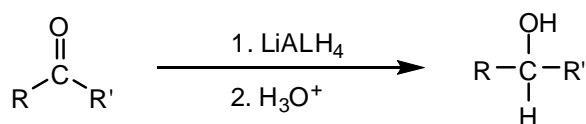


5. Reduction (adding H) of carbonyl groups: forms primary or secondary alcohols

- Reduction using Sodium Borohydride
 - Reduces only aldehydes and ketones.



- Reduction using Lithium Aluminium Hydride
 - Reduces aldehydes, ketones, acids and esters.



- Reduction using Raney Nickel (Catalytic Hydrogenation)
 - Reduces aldehydes, ketones, and double bonds.

