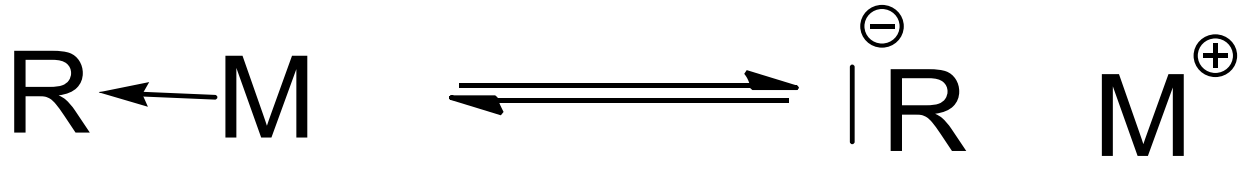
Organometallic compounds



Nomenclature

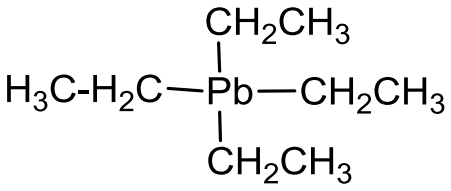
the polarisation depends upon the character of the metal

methylsodium

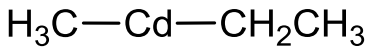
CH_3-Na

$CH_3CH_2CH_2CH_2-Li$

butyllithium



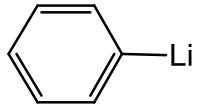
tetraethylplumbium



ethylmethylcadmium

CH_3 Mg Br

methylmagnesiumbromid



phenyllithium

Organometallic compounds

reactivity of the compound depends upon the quality of the metal – its position in periodic systeme

Reactivity:

1. **Basicity** – extrem basicity
2. Nucleophility

Theory of HSAB:

Arhenius, Bronstead

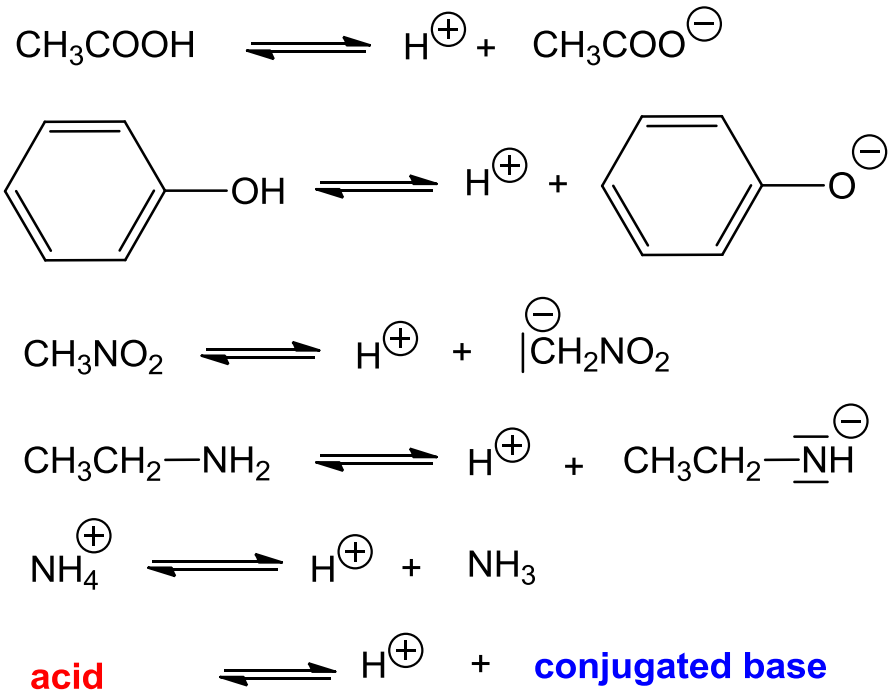
To show basicity a presence of acid is needed,

it is necessary interaction of two partners

mostly we are considering reactions in water

but

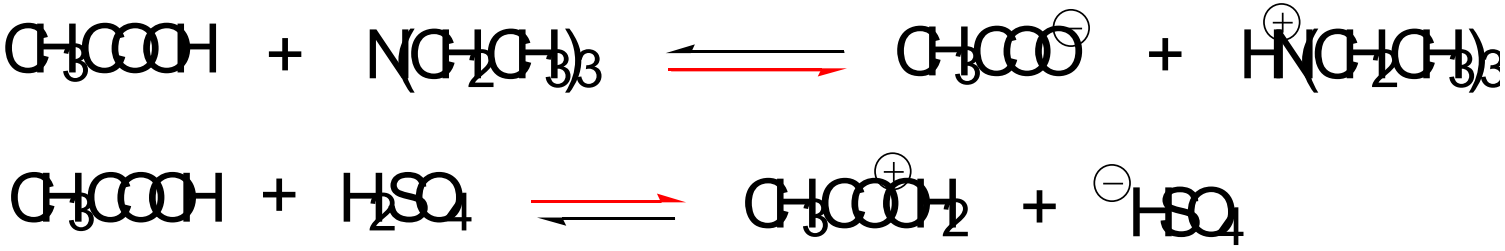
also a lot of reactions proceeds in non-aqueous medium, but also there one partner may be an acid and the other a base

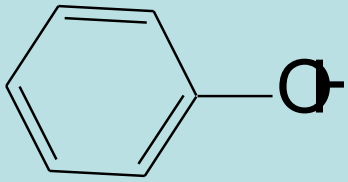


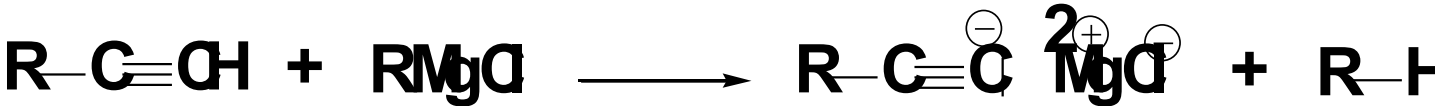
Organometallic compounds

Reactivity:
1. **Basicity** – extrem basicity
2. Nucleophility

RELATIVITY ACID vs. BASE



	$R-C\equiv CH$	CH_3CH	H_2O	
pK_a	25	16	15,7	10



K1 B2 B1 K2

$pK_a1 = 25$ $pK_a2 = 50$

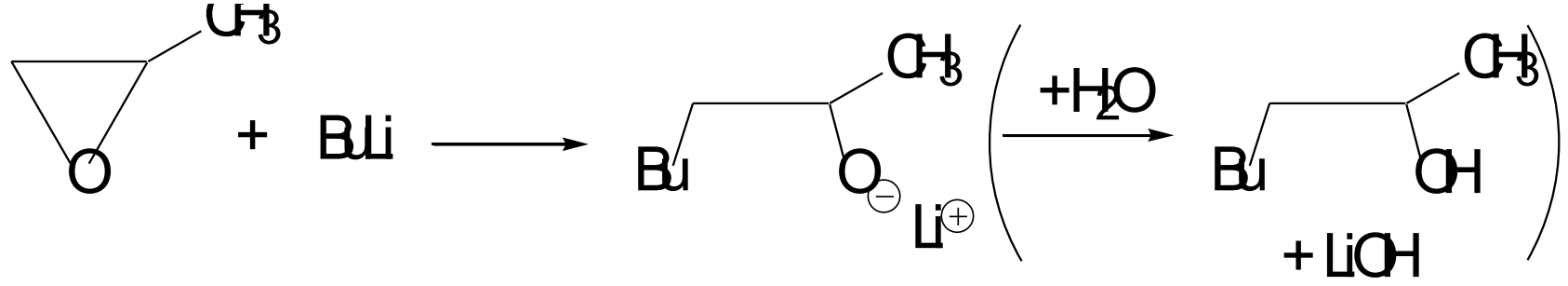
Organometallic compounds

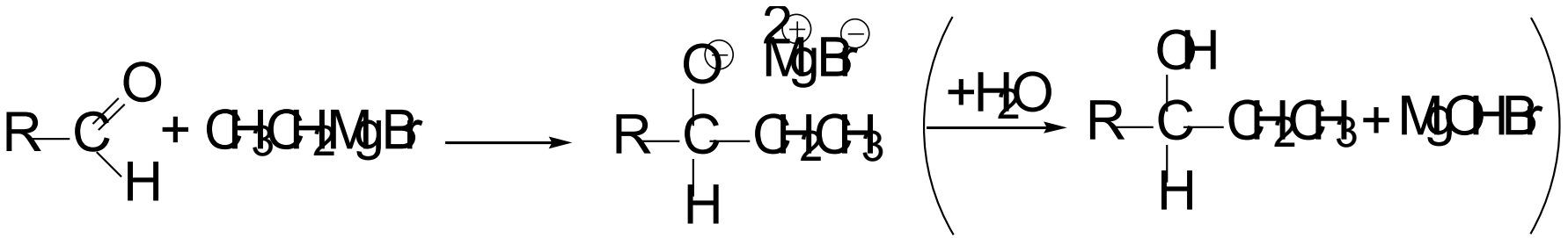
reactivity of organometal depends upon its position in periodic system

Reactivity:
1. Basicity – extrem basicity
2. **Nucleophility**

strong nucleophile

in case in the molecule is not acidic atom, then reacts as nucleophile





Organometallic compounds

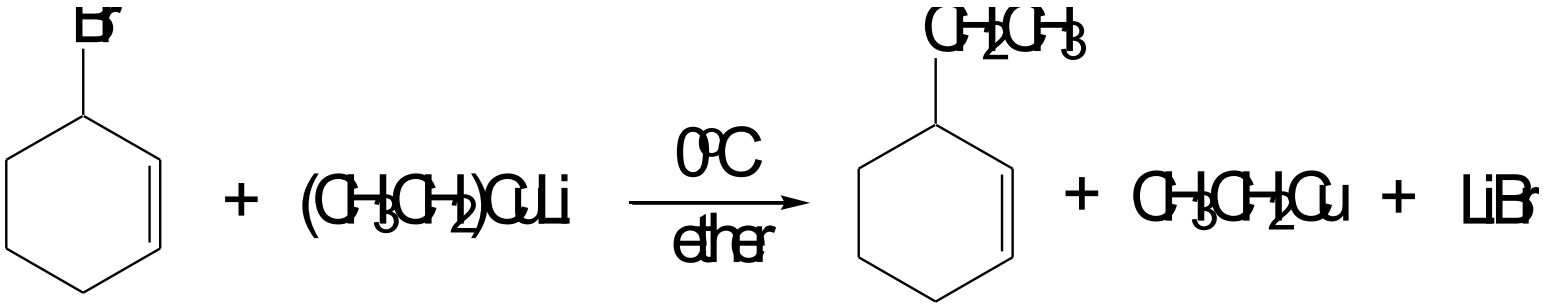
reactivity of organometal depends upon its position in periodic system

Reactivity:
1. Basicity – extrem basicity
2. **Nucleophility**

depression of nucleophility by a tranfer to cuprates

$$RLi + CuI \longrightarrow R_2CuLi$$ lithium dialkylcuprate — **Gilman reagent**

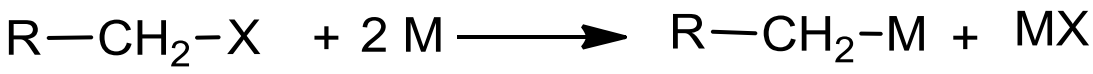
$$R_2CuLi + R^1{-}X \longrightarrow R^1{-}R + RCu + LiX$$

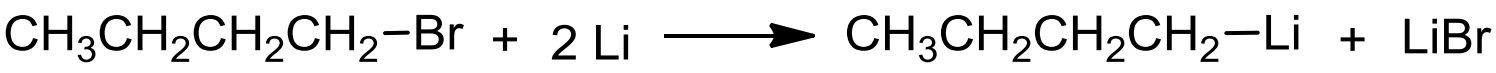


Organometallic compounds

Methodes of preparation:

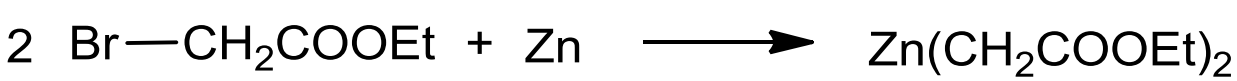
1. Reaction alkyl halogenides with metals



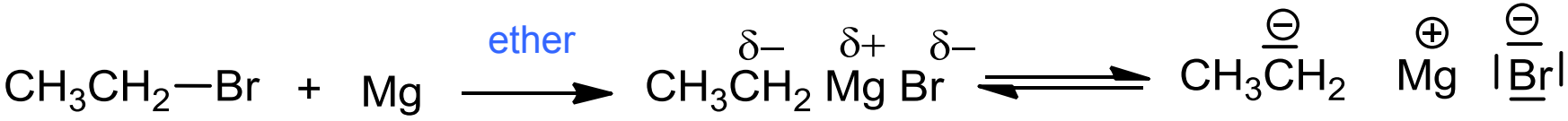


sometimes combined systemes

Reformatsky

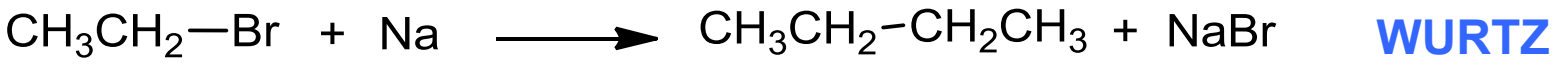


Grignard reagent



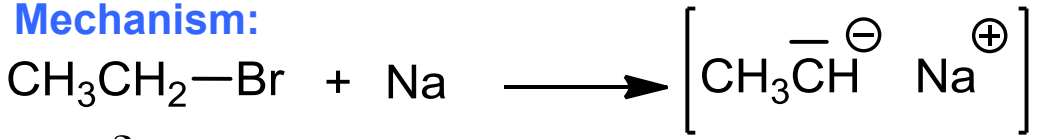
Organometallic compounds

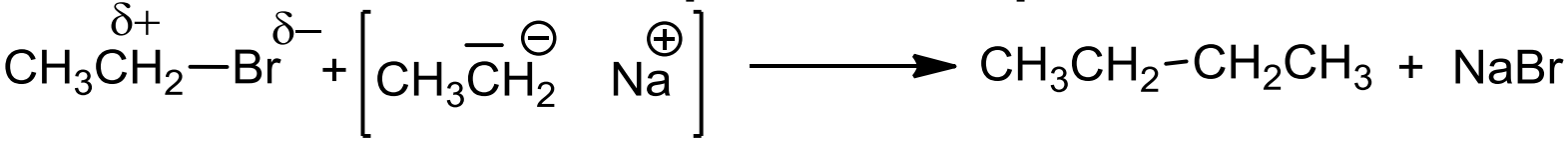
this is imposible to use for organometals with Na and K



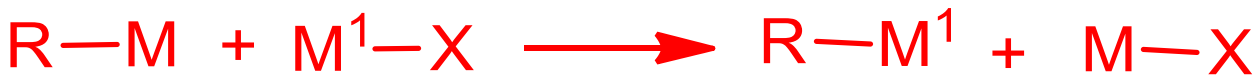
WURTZ

Mechanism:

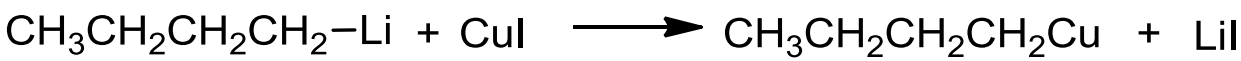


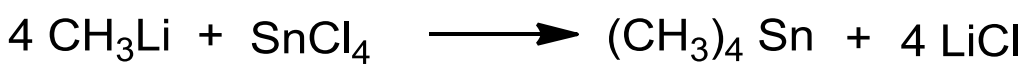


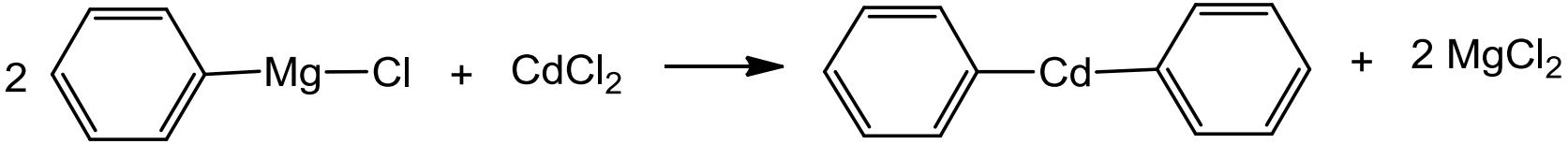
2. exchange reaction between organometal and salt of other metal



M is more elektropozitive than metal M^1, X is halogen







Organometallic compounds

3. application of acidic hydrogen atoms in a molecule