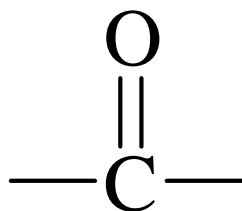
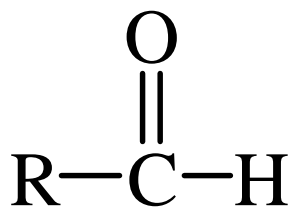


## Aldeidi e chetoni

Composti organici che contengono legami doppi C=O e legami singoli C-H e C-C

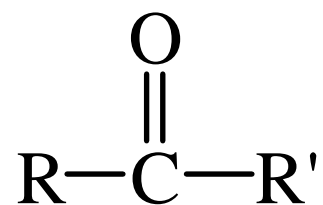


Gruppo Carbonilico



Un' Aldeide

R=Alchile, Arile

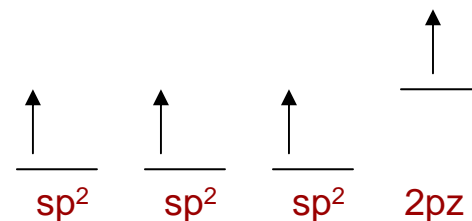


Un Chetone

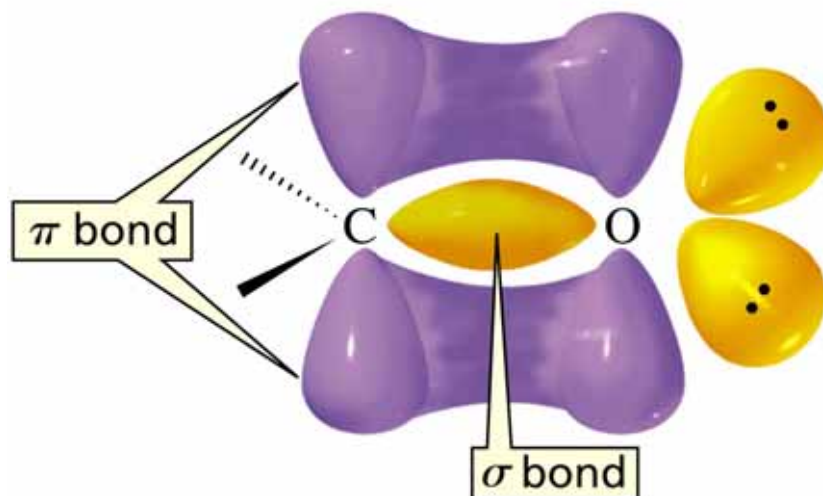
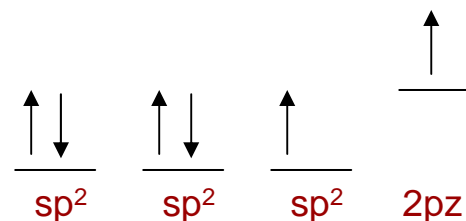
R=R'=Alchile, Arile

## Il gruppo carbonilico

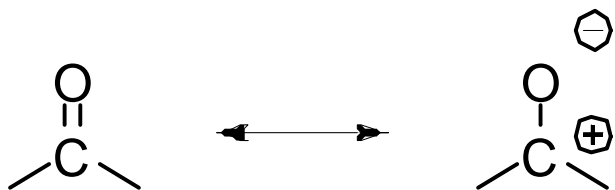
Elettroni di valenza del carbonio :  $2s^2 2p^2$   
con orbitali ibridi  $sp^2$  :



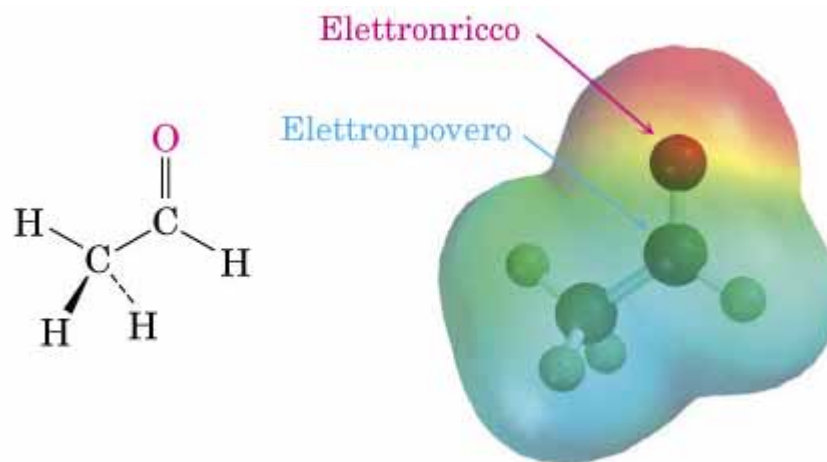
Elettroni di valenza dell'ossigeno :  $2s^2 2p^4$   
con orbitali ibridi  $sp^2$  :



## Il gruppo carbonilico



**Elettronegatività:** C 2,5  
O 3,5



L'atomo di carbonio è un sito elettrofilo, l'atomo di ossigeno un sito nucleofilico/basico

## Nomenclatura delle aldeidi

Si individua la catena di atomi di carbonio più lunga **contenente** il gruppo carbonilico e si cambia la desinenza in **-ale**.

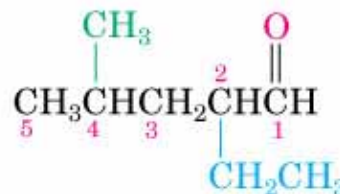
Si numerano i carboni **partendo** dal gruppo aldeide. Si assegnano numero e nome a ciascun sostituyente che vengano riportati in ordine alfabetico



**Etanale**  
(Acetaldeide)

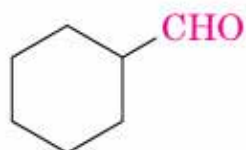


**Propanale**  
(Propionaldeide)



**2-Etil-4-metilpentanale**

Per le aldeidi che hanno il **-CHO** legato a un anello si usa la desinenza **-carbaldeide**.



**Cicloesancarbaldeide**



**2-Naftalencarbaldeide**

## Nomi comuni delle aldeidi

FORMULA	NOME COMUNE	NOME SISTEMATICO
HCHO	Formaldeide	Metanale
CH <sub>3</sub> CHO	Acetaldeide	Etanale
CH <sub>3</sub> CH <sub>2</sub> CHO	Propionaldeide	Propanale
CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CHO	Butirraldeide	Butanale
CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CHO	Valeraldeide	Pentanale
H <sub>2</sub> C=CHCHO	Acroleina	2-Propenale
PhCHO	Benzaldeide	Benzencarbaldeide

## Nomenclatura dei chetoni

Si individua la catena di atomi di carbonio più lunga **contenente** il gruppo carbonilico e si cambia la desinenza in **-one**.

Si numerano i carboni **partendo** dall'estremità più vicina al gruppo carbonilico. Si assegnano numero e nome a ciascun sostituente che vengano riportati in ordine alfabetico



**3-Esanone**



**4-Esen-2-one**

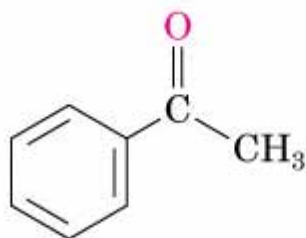


**2,4-Esandione**

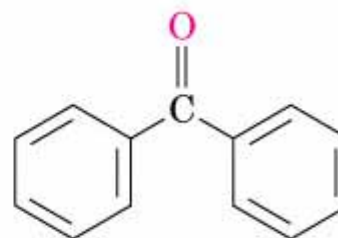
## Nomi comuni dei chetoni



**Acetone**

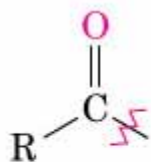


**Acetofenone**



**Benzofenone**

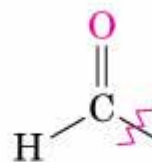
## Sostituenti carbonilici



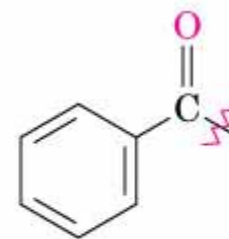
**Gruppo acile**



**Acetile**



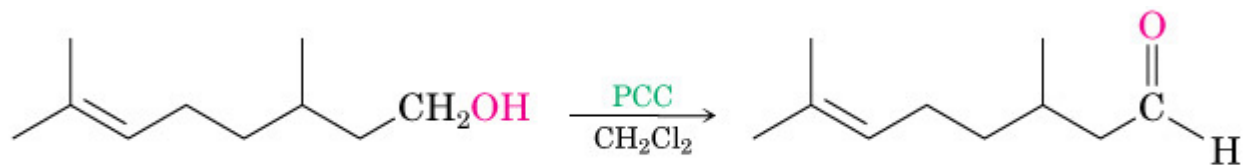
**Formile**



**Benzoile**

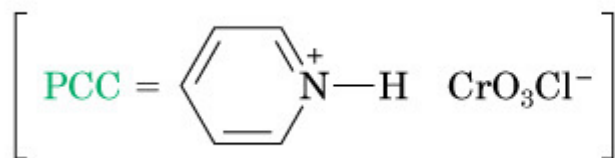
## Preparazione di aldeidi e chetoni

Ossidazione di alcoli primari con ossidanti blandi: **aldeidi**

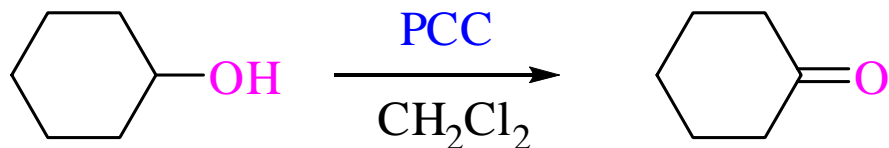


**Citronellolo** (dall'olio di rose)

**Citronellale** (82%)

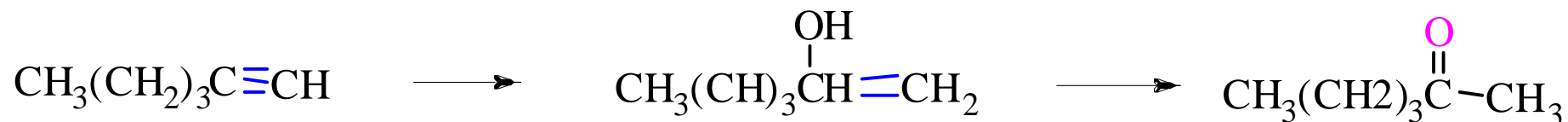


Ossidazione di alcoli secondari: **chetoni**



## Preparazione di aldeidi e chetoni

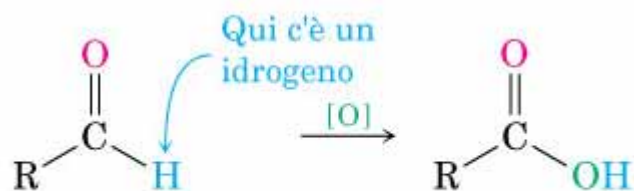
### Idratazione di alchini



### Sostituzione di Friedel-Crafts

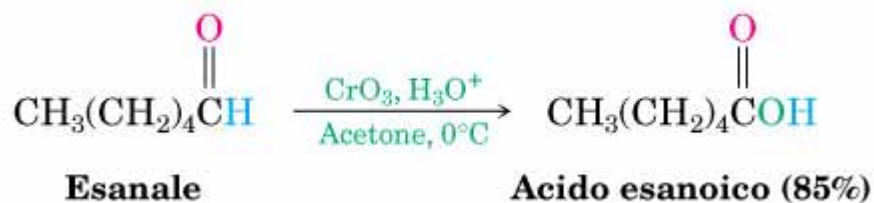


## Reazioni di aldeidi e chetoni: ossidazione

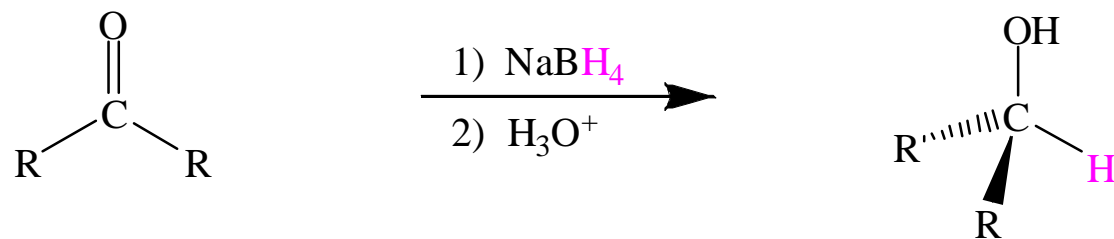


**Aldeide**

Un aldeide può essere ancora ossidata ad acido carbossilico, un chetone è già giunto al massimo stato di ossidazione

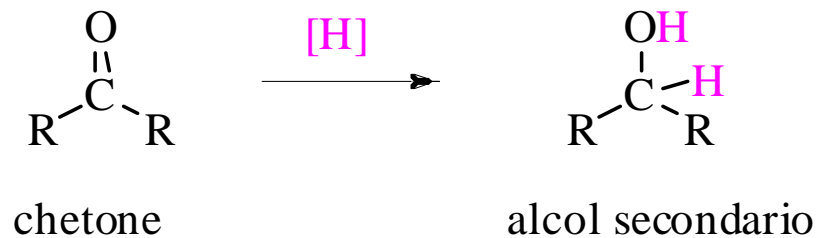
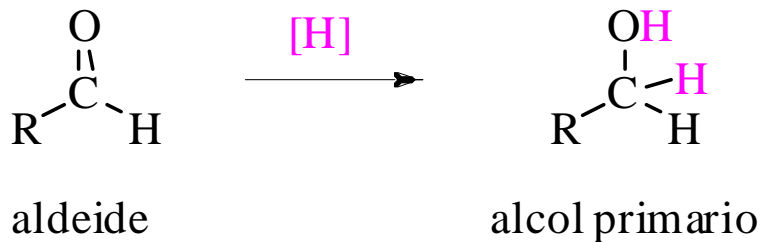


## Reazioni di aldeidi e chetoni: riduzione

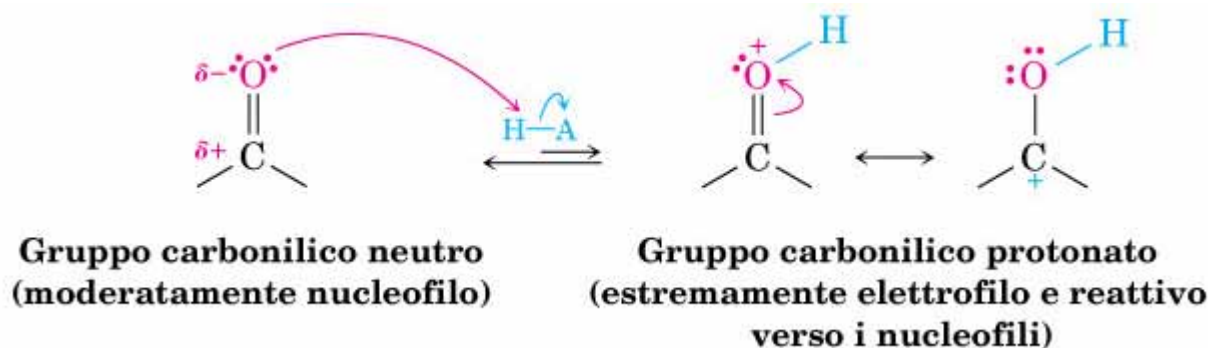
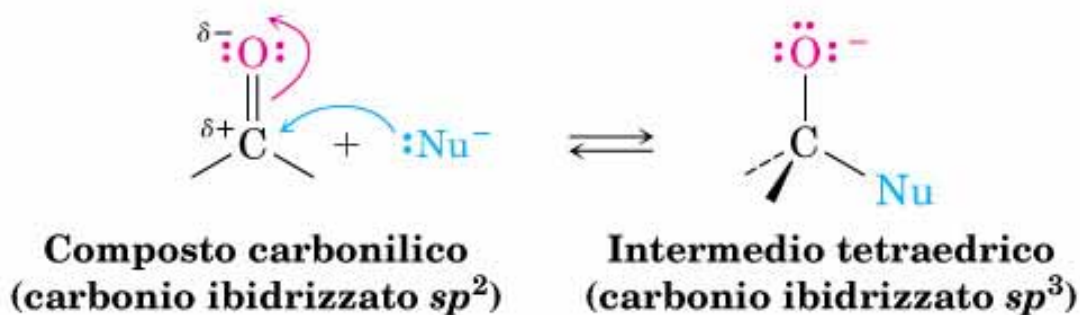


un' aldeide o un chetone

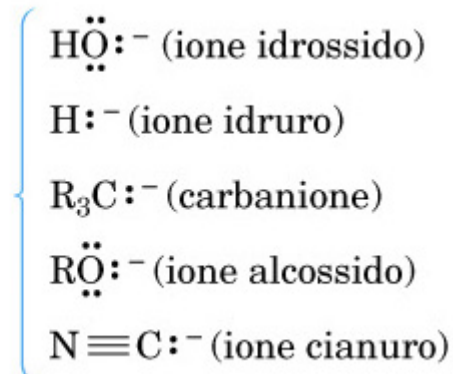
un alcol



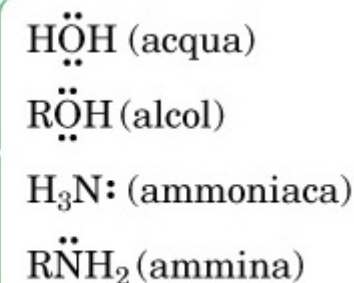
## Reazioni di aldeidi e chetoni: addizione nucleofila



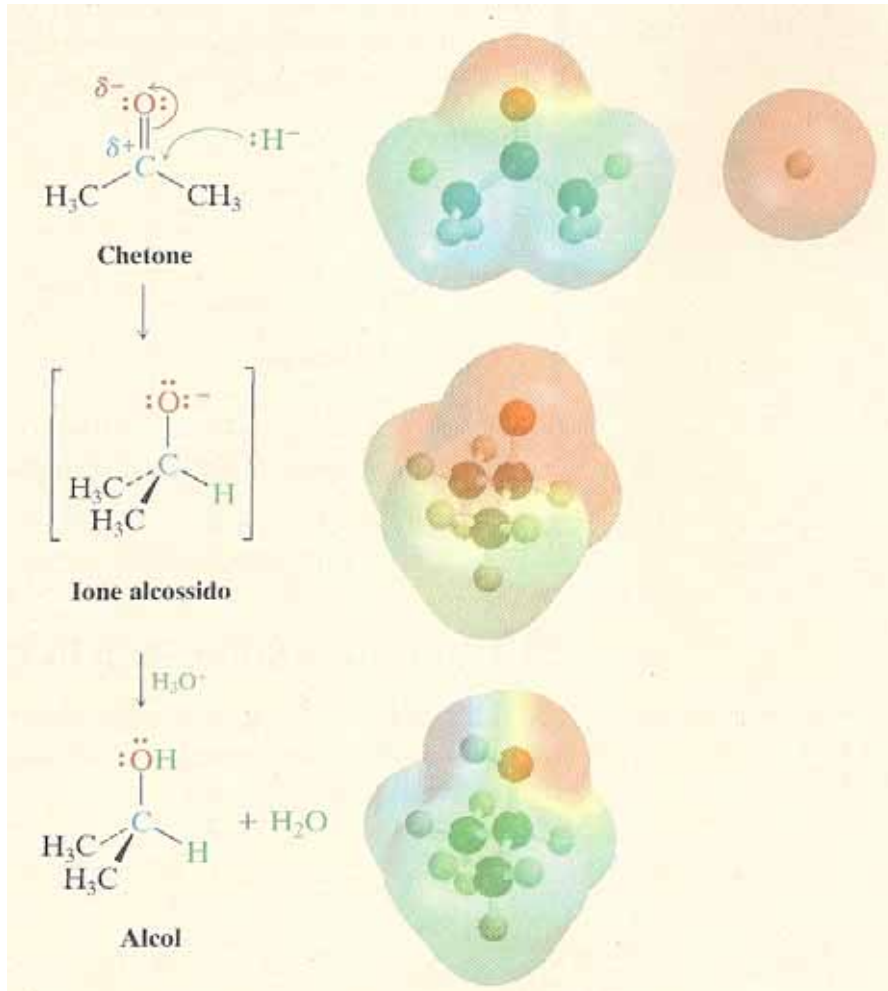
**Alcuni nucleofili carichi negativamente**



**Alcuni nucleofili neutri**



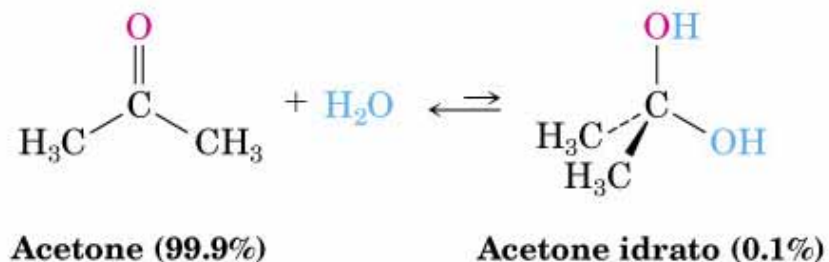
# Riduzione: addizione di idrogeno



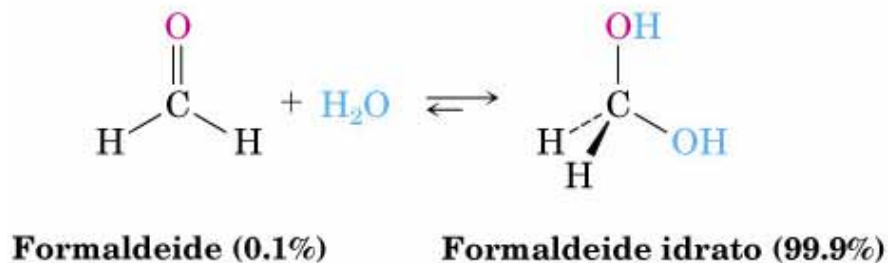
$\text{NaBH}_4$ : fonte di **idruro**

# Idratazione: addizione di acqua

## Chetoni

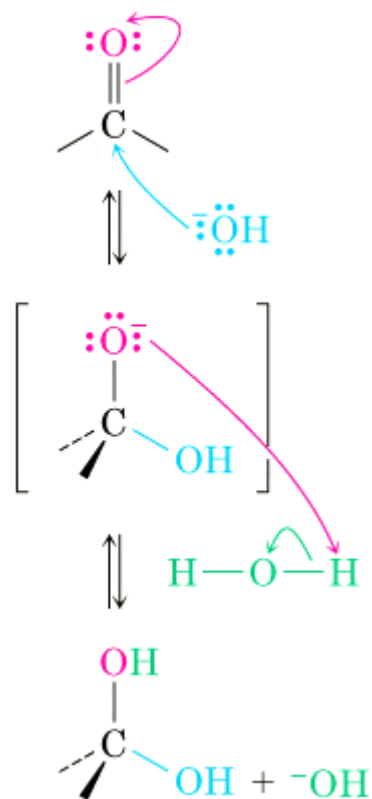


## Aldeidi

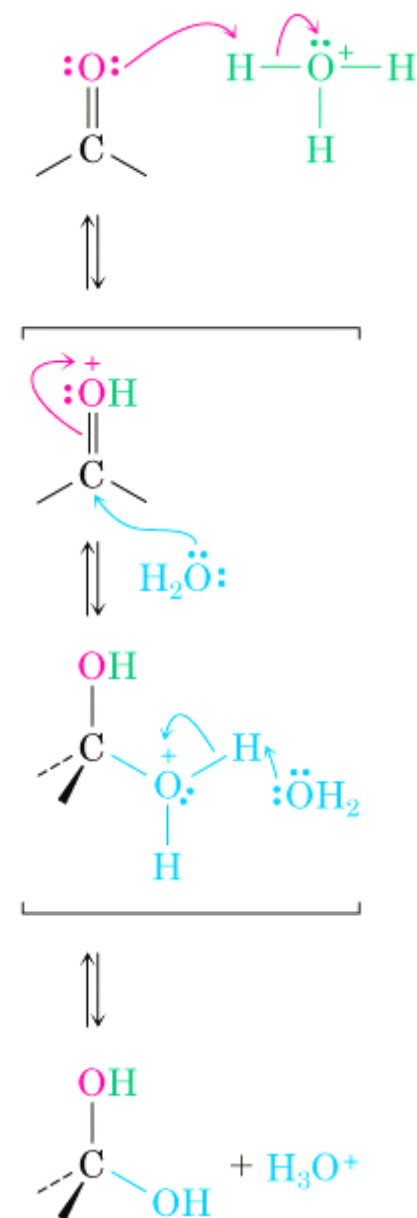


# Idratazione: addizione di acqua

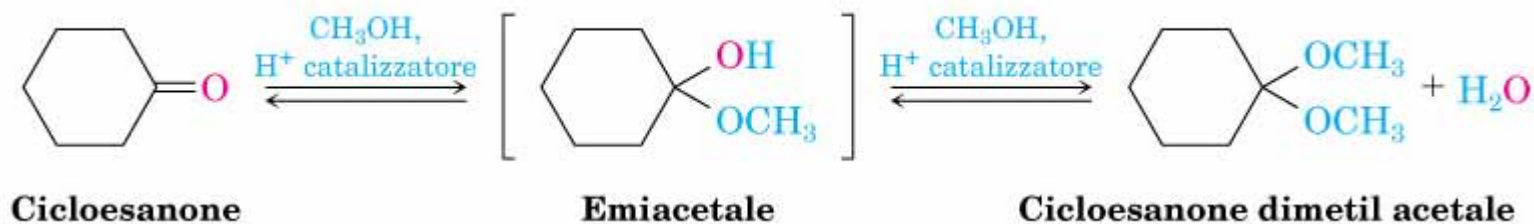
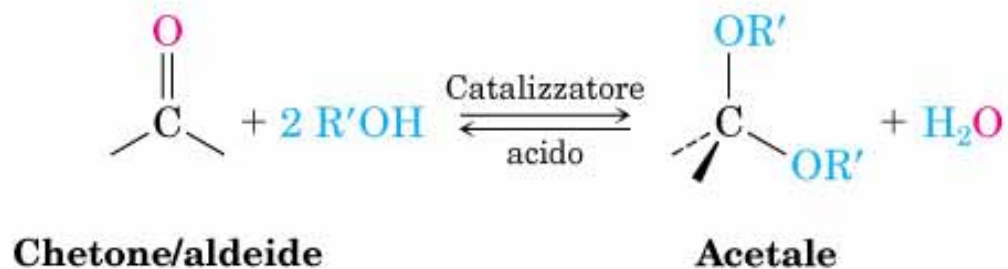
**Catalisi  
basica**



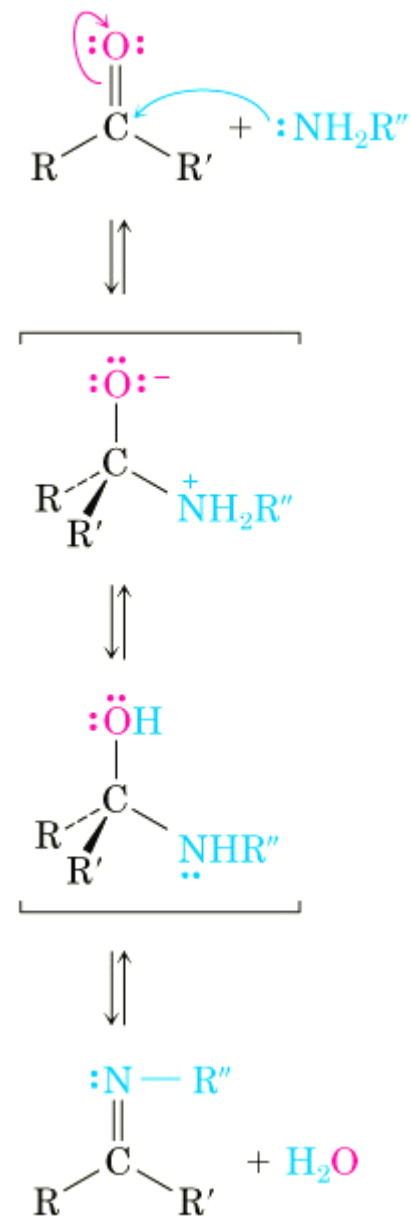
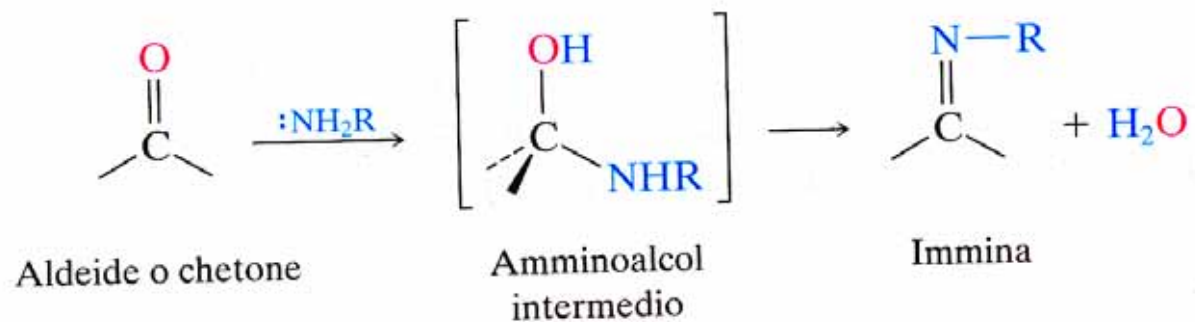
**Catalisi  
acida**



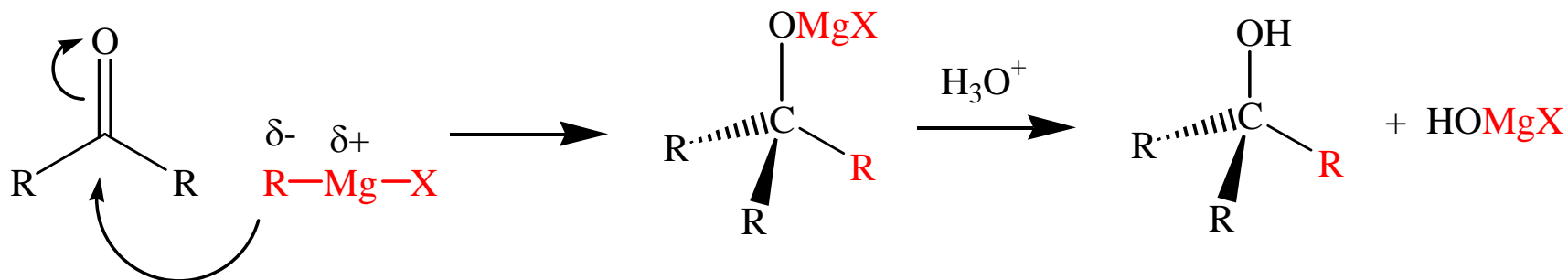
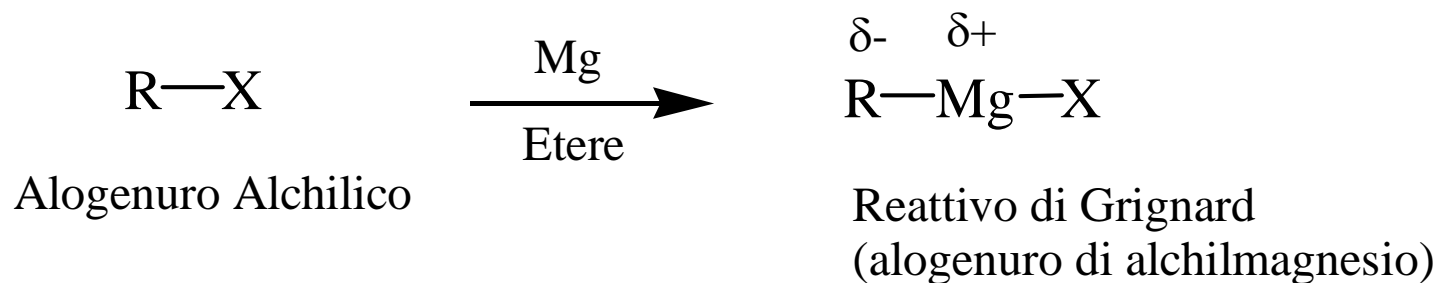
## Acetali: addizione di alcoli



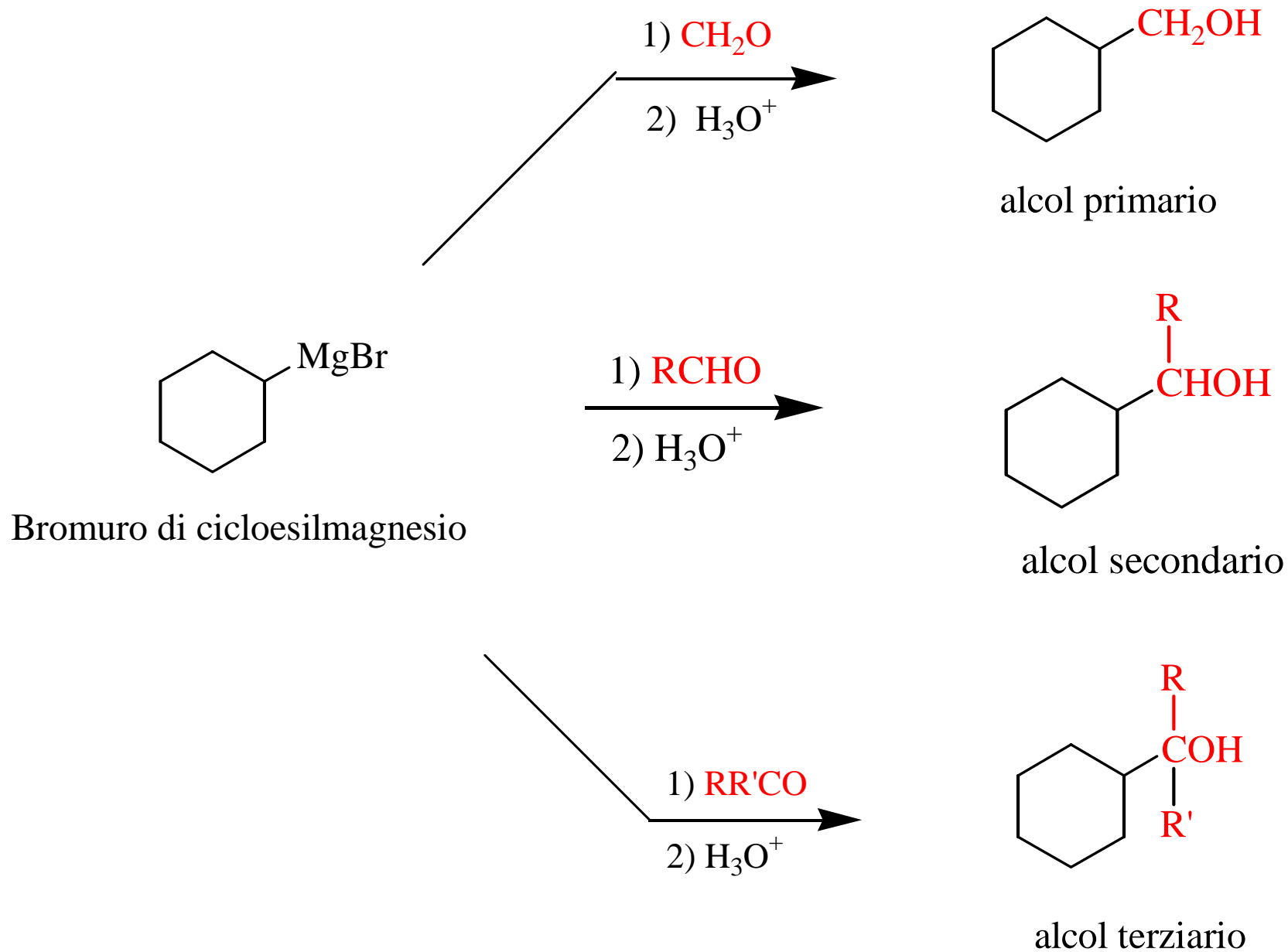
# Immine: addizione di ammine



## Alcoli: addizione di reattivi di Grignard

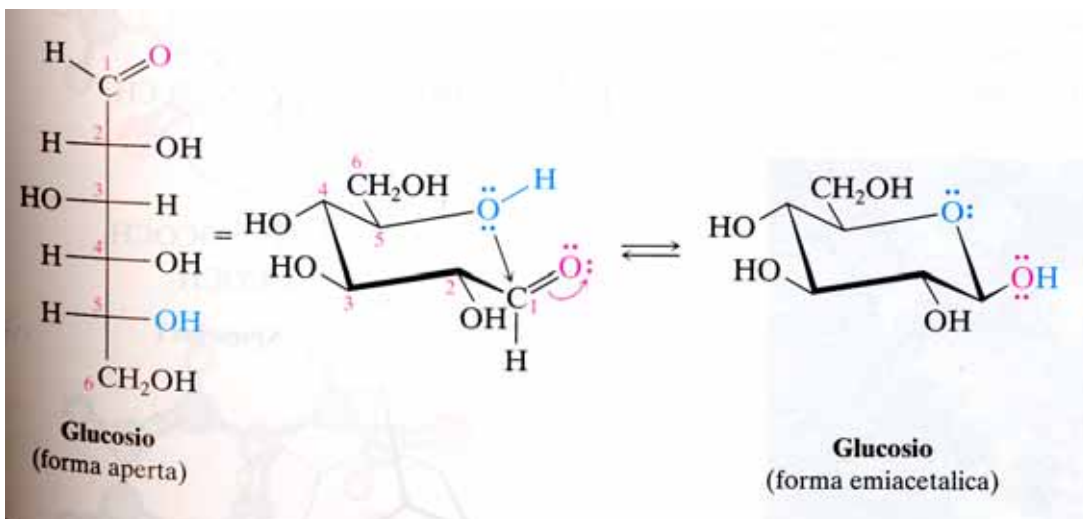


## Alcoli: addizione di reattivi di Grignard

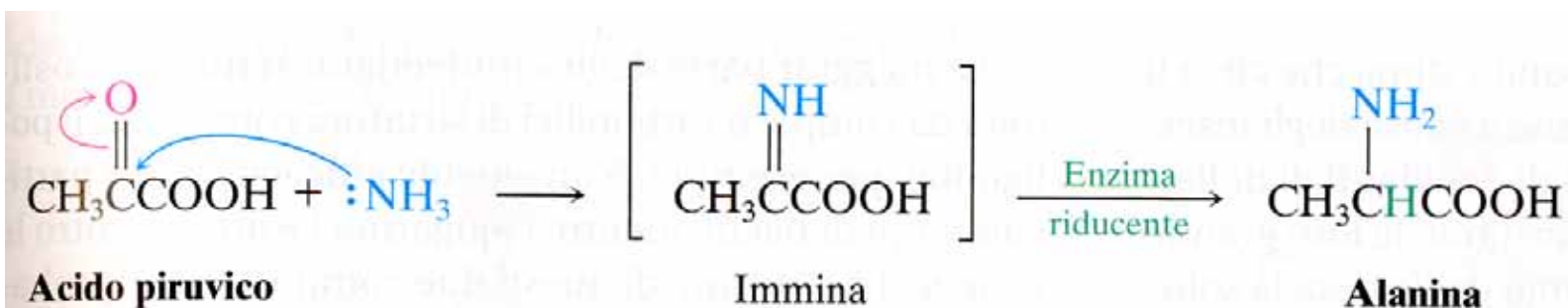


## Addizioni a carbonili in natura

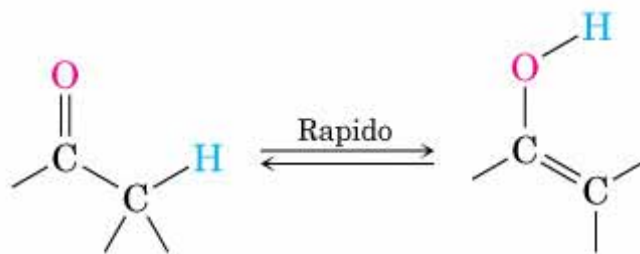
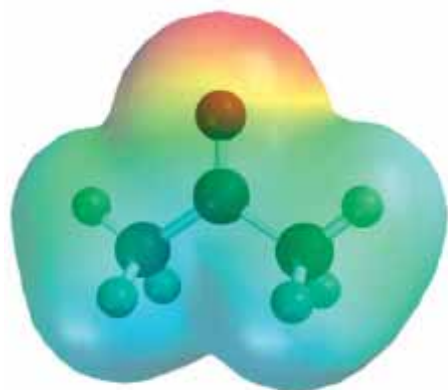
### Zuccheri



### Sintesi di amminoacidi

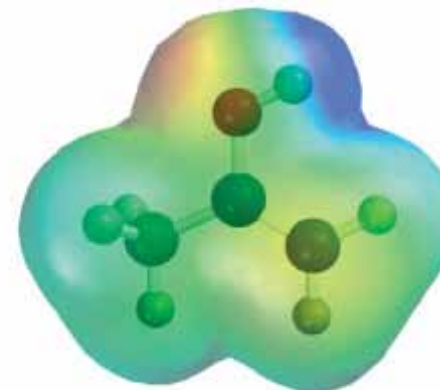


# Tautomeria cheto-enolica



Tautomero chetonico

Tautomero enolico



**Tautomeri:**

isomeri costituzionali in equilibrio tra loro  
 Gli isomeri differiscono nella localizzazione  
 di un atomo di idrogeno e di un doppio legame  
 rispetto ad un eteroatomo (O, S, N)