

Physical properties

الفيزيائية

① Hydrogen bond

الرابطة الهيدروجينية

- They can form hydrogen bonds because of diff. in electro negativity between O & H with polarize the O-H bond



- This make them diff than hydro carbons.

- Hydrogen bond is stronger in phenol  $ArOH > R-OH$

② Solubility

الذوبانية

- soluble in H<sub>2</sub>O and polar solvante due to hydrogen bond.

- C<sub>2</sub>, C<sub>3</sub> and C<sub>4</sub> soluble in H<sub>2</sub>O → ∞

- Solubility ↓ with ↑ \* Carbon

- Phenols are soluble in H<sub>2</sub>O

- # of OH ↑ solubility ↑

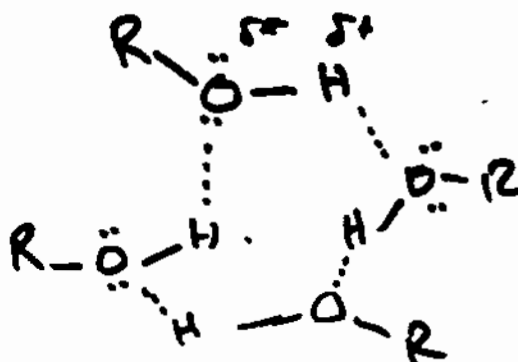
③ B.P

درجات الغليان

- higher than its corresponding hydrocarbo (Hydrogen B)

- \*OH ↑ B.P. ↑

R = alkyl  
Ar



# Acidity of alcohols and phenols

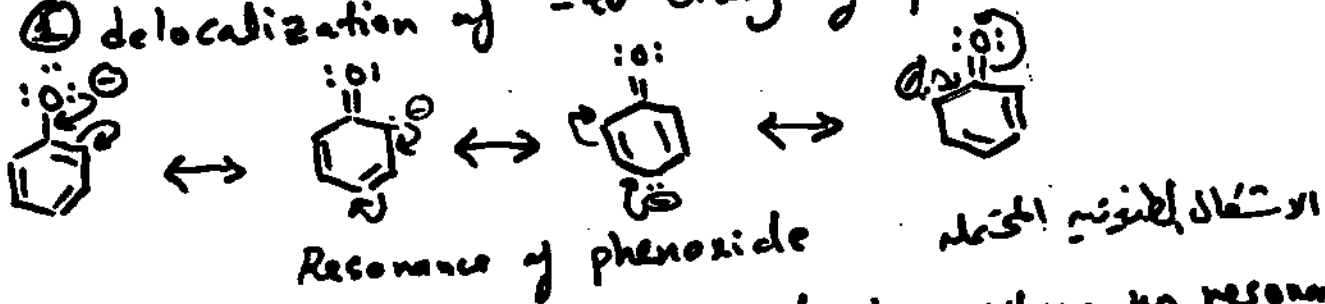
(68)

$H_2O \rightarrow$  phenol  $>$  alcohol  $>$  alkyne  $>$  alkene  $>$  alkane



Why  $AroH > ROH$ ?

① delocalization of  $-e^-$  charge of phenoxide.



- resonance stabilized phenoxide ion where no resonance in alkoxide ion

②  $-R$  is electron donor so  $-e^-$  charge is localized on oxygen and  $R \uparrow -e^-$  charge  $R \rightarrow O^{\ominus}$

$\therefore$  in phenol group will determine the acidity

Ⓐ activating group  $\text{e}^-$  donor  $\downarrow$  acidity less than  $\text{C}_6\text{H}_5\text{OH}$  e.g.  $\text{CH}_3$

Ⓑ deactivating group  $\text{e}^-$  withdrawing  $\uparrow$  acidity more than  $\text{C}_6\text{H}_5\text{OH}$  e.g.  $\text{NO}_2$

In general  $\uparrow$  stable phenoxide  $\uparrow$  acidity

$R-OH$  acidity in general  $\text{CH}_3\text{OH} > 1^\circ > 2^\circ > 3^\circ$  why??