ملخص قوانين فاينل الكيمياء 💜

💜 دعواااااتكمم 💜💜

TARIQ💜

Ch.3

① Naming binary ionic compound [invariant charge]:

Name of cation + base name of anion + ide

② Naming binary ionic compound [variable charge]:

name of cation + [charge of cation in roman numerals] + base name of anion + ide

③ Naming the binary molecular compounds:

Prefix + name of the first element + Prefix + base name of 2nd element + ide

e.g. = carbon monoxide

④ Naming binary acids:

hydro + base name of nonmetal + ic + acid

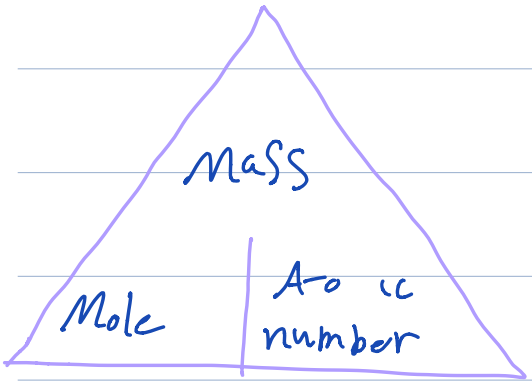
e.g. = Hydrofluoric acid

5 Formula mass / Molar mass:

(Number of atoms of 1st element × Atomic mass of 1st element) + (Number of atoms of 2nd element × Atomic mass of 2nd element)

e.g. = H_2O = [2 × 1] + [1 × 16] = 18 g/m

6 Mole conversion:



r
s

Mole | 6.022×10^{23}

7 Mass Percent:

$$\text{Mass Percent of element } X = \frac{\text{Molar mass of } X}{\text{Molar mass of the compound}} \times 100$$

8 finding the empirical formula:

[29.5% of carbon]

(1) Convert the

① Convert the percentages to grams:

24.5% ⟶ 24.5 g

② Convert masses to moles:

$\frac{24.5}{12} = 2.04$ mole

③ divide all by the smallest number

④ Multiply all mole ratios to make all whole number

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⑨ Calculating Molecular formula:

Molecular formula = empirical formula X n

$$n = \frac{\text{molar mass of Molecular formula}}{\text{molar mass of empirical formula}}$$

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⑩

TABLE 3.6 The Effect of Electronegativity Difference on Bond Type

Electronegativity Difference (ΔEN)	Bond Type	Example
Small (0–0.4)	Covalent	Cl_2
Intermediate (0.4–2.0)	Polar covalent	HCl
Large (2.0+)	Ionic	NaCl

(11) Bond energy

from up to down: get weaker

from left to right: get stronger

(12) Bond Length:

from up to down: Increase

from left to right: Decrease

Triple bond: short and strong

Single bond: long and weak

Ch. 4

(13) The percent yield: $\frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100$

★ Actual yield less than theoretical yield

(14) Concentration of Solutions:

$$\text{Molarity} = \frac{\text{Amount of Solute [in mol]}}{\text{Volume of Solution [in L]}}$$

(15) Solution Dilution:

$$M_1 V_1 = M_2 V_2$$

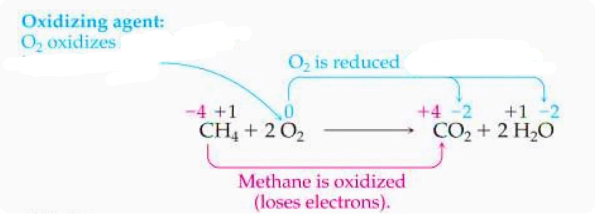
16

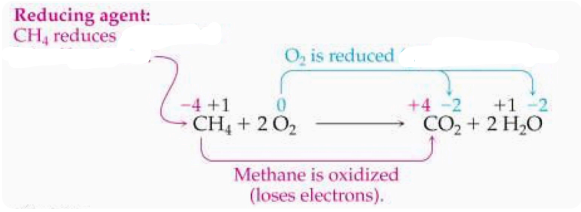
Strong Electrolyte: Completely ionize, Conduct electricity

Weak Electrolyte: Partially ionize, Conduct electricity

Non Electrolyte: don't ionize, don't Conduct electricity

18





19

Oxidation: Increase in oxidation State

Reduction: Decrease in oxidation State

Ch. 5

(20) The equilibrium constant:

$$K_{eq} = \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

★ $[A]$ = Molar concentration of A

$[B]$ = " " " B

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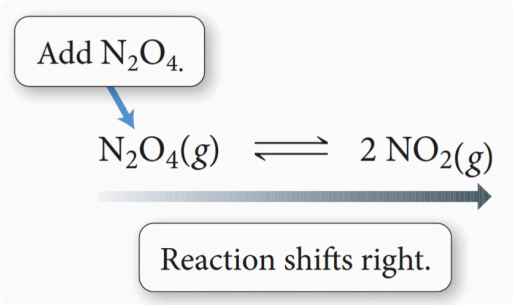
(21)

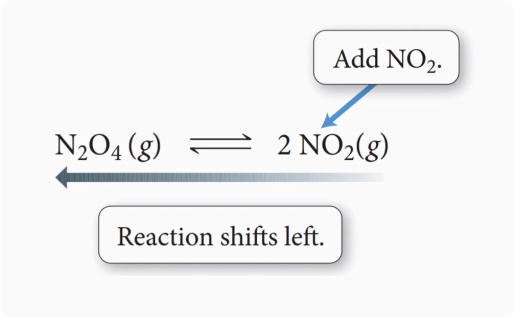
$K >> 1$:
- forward reaction is favored
- the reaction moves right
- the position of equilibrium favors product

$K << 1$
- Reverse reaction is favored
- the reaction moves left
- the positio of equilibrium favors reactant

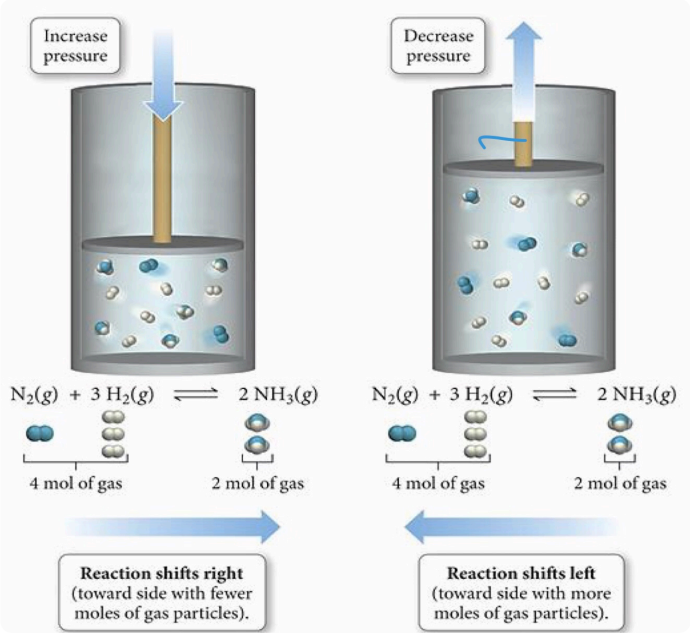
$K \approx 1$ ——→ Neither direction is favored

22 Concentrations



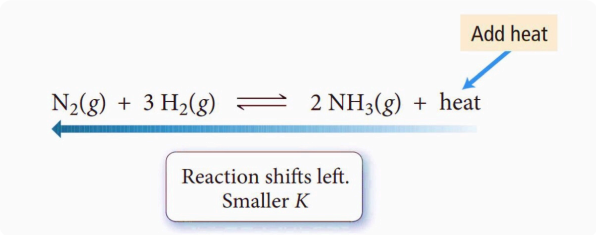


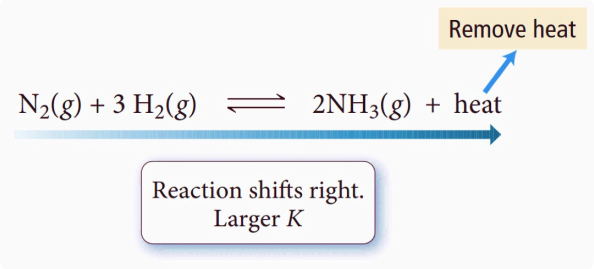
23 Change in Pressure



24

change in temperature





25

Neutralization Reaction:

Acid + Base ⟶ H_2O + Salt

26

le: $NH_3(aq) + H_2O(l) \rightleftharpoons NH_4^+(aq) + OH^-(aq)$

Base — Acid — Conjugate acid — Conjugate base

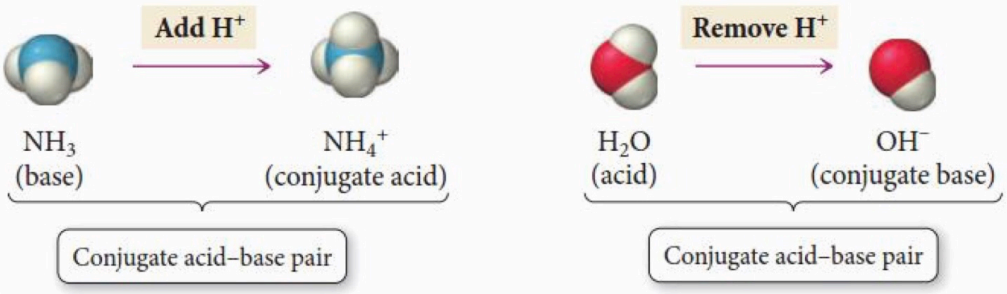


TABLE 5.4 Strong Acids

Hydrochloric acid (HCl)	Nitric acid (HNO_3)
Hydrobromic acid (HBr)	Perchloric acid ($HClO_4$)
Hydriodic acid (HI)	Sulfuric acid (H_2SO_4) (*diprotic*)

TABLE 5.4 Some Weak Acids

Hydrofluoric acid (HF)	Sulfurous acid (H_2SO_3) (*diprotic*)
Acetic acid ($HC_2H_3O_2$)	Carbonic acid (H_2CO_3) (*diprotic*)
Formic acid ($HCHO_2$)	Phosphoric acid (H_3PO_4) (*triprotic*)

27

$pH = -\log[H_3O^+]$ $\quad pH + pOH = 14$

$pOH = -\log[OH^-]$ $\quad [OH^-] \times [H_3O^+] = 1 \times 10^{-14}$

pH < 7.0	**Solution is acidic**	**$[H_3O^+] > [OH^-]$**
pH = 7.0	**Solution is neutral**	**$[H_3O^+] = [OH^-]$**
pH > 7.0	**Solution is basic**	**$[H_3O^+] < [OH^-]$**

The pH Scale

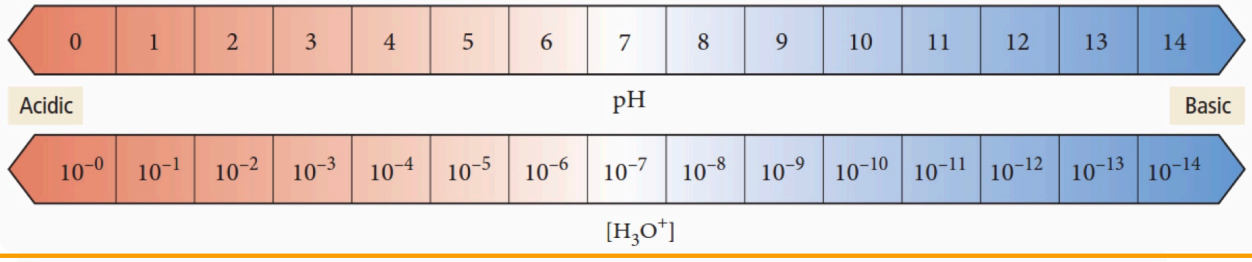


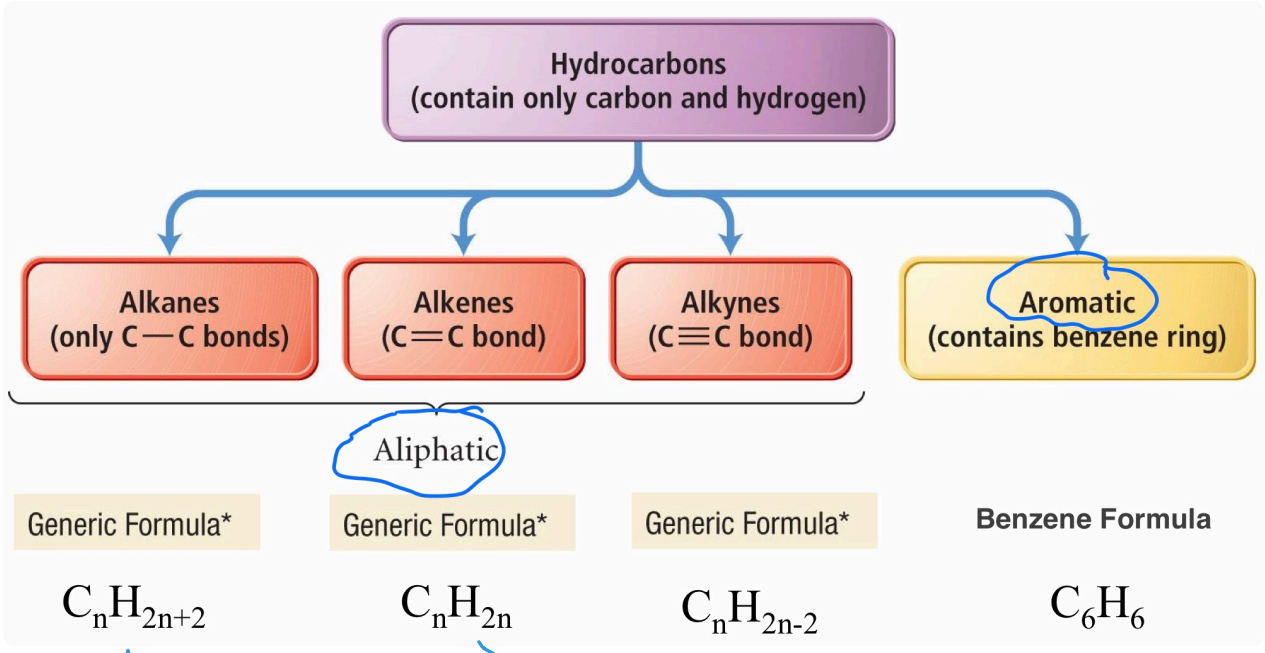
TABLE 5.7 Strong Bases

Lithium hydroxide ($LiOH$)	Strontium hydroxide [$Sr(OH)_2$]
Sodium hydroxide ($NaOH$)	Calcium hydroxide [$Ca(OH)_2$]
Potassium hydroxide (KOH)	Barium hydroxide [$Ba(OH)_2$]

(28) Buffers = weak acid/base + Salt of that acid or base

e.g. = HF + NaF

Ch.7



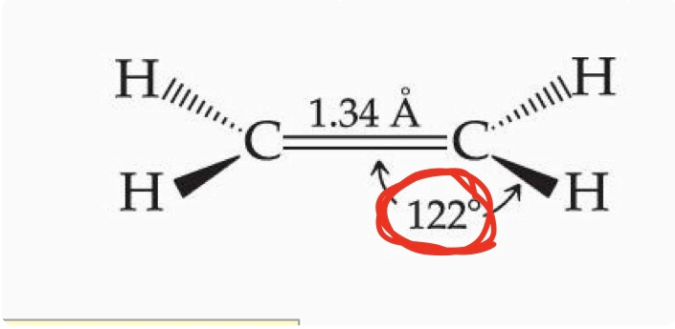
Saturated hydrocarbons

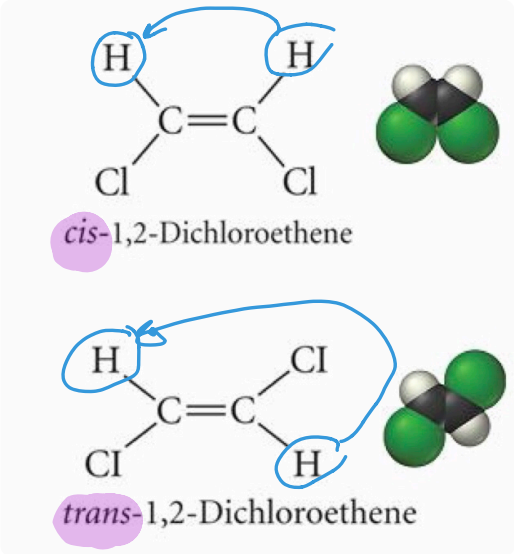
Un Saturated hydrocarbons

★ the general formula of cycloalkanes is C_nH_{2n}

Alkenes

The simplist alkene is $CH_2=CH_2$ — IUPAC name → ethene; Common name → ethylene





★ If an alkene contains two double bonds:

The name will end with [diene]

★ If an alkene contains three double bonds:

The name will end with [triene]

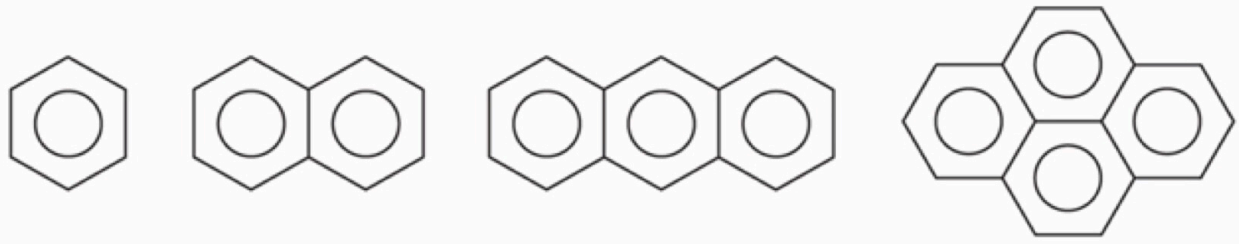
Alkynes

The simplist alkyne is CH ≡ CH

IUPAC name → ethyne

Common name → acetylene

Aromatic Compound

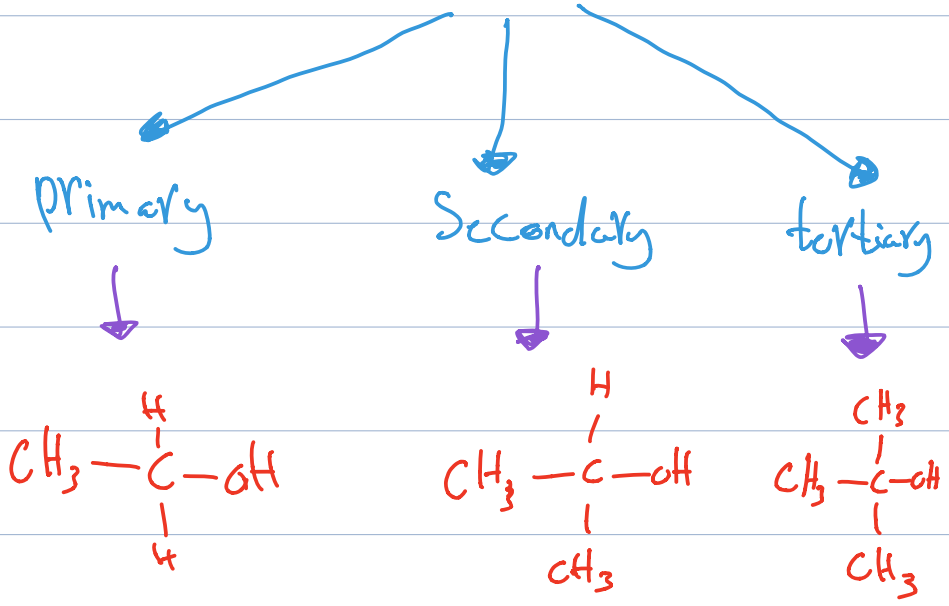


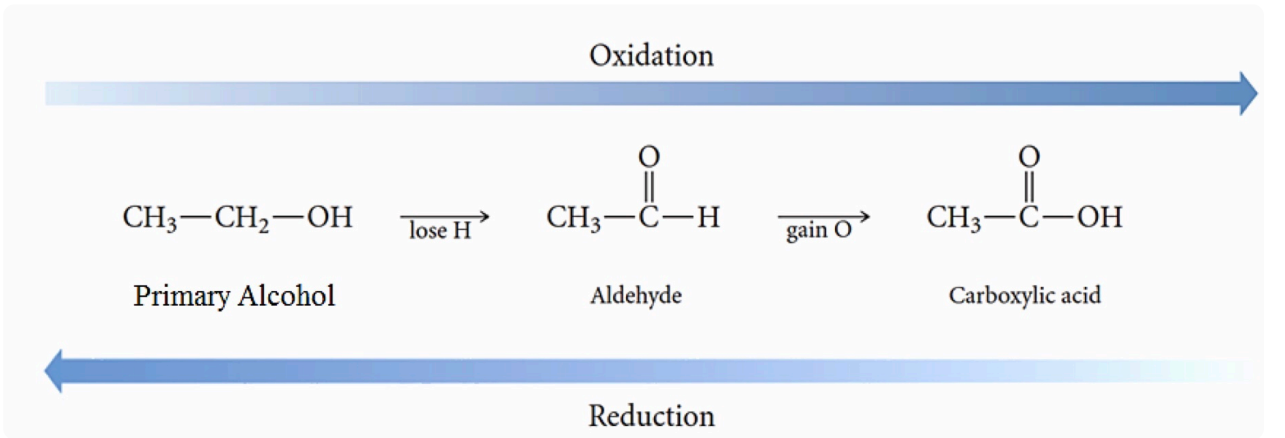
Benzene Naphthalene Anthracene Pyrene

- **Structure:**
- **Common Name:** toluene phenol aniline
- **IUPAC Name:** (methylbenzene) (hydroxybenzene) (aminobenzene)

Functional Groups

Alcohol





Ethers:

- They can be formed from two molecules of Alcohol [Condensation Reaction]
- Tend to be unreactive
- They are used as [Medical anesthetics]

Aldehydes and Ketones:

- They can be prepared by the controlled [oxidation of alcohol]

Carboxylic acids:

- They are weak acids
- They can be produced by [oxidation of alcohols]
- They are the most common organic acids.

Esters: are the products of reaction between [Alcohols + carboxylic acid] by condensation Reaction.

- The are responsible for the pleasant aroma/odor

★ Saponification Reaction:

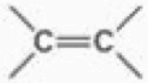
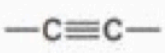
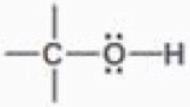
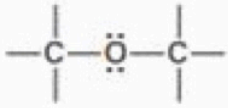
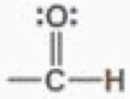
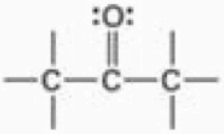
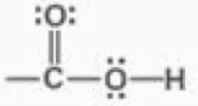
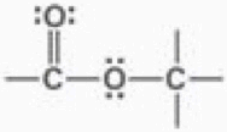
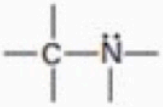
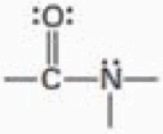
Ester + strong base → Span [carboxylic acid] + Alcohols

Amine:

★ They are the most common organic bases.

Amide:

★ They can be formed from [Amine + carboxylic acid] condensation reaction.

Functional Group	Compound Type	Suffix
	Alkene	*-ene*
	Alkyne	*-yne*
	Alcohol	*-ol*
	Ether	*ether*
	Aldehyde	*-al*
	Ketone	*-one*
	Carboxylic acid	*-oic ac*
	Ester	*-oate*
	Amine	*-amine*
	Amide	*-amide*