Lecture 1

•Date: 24-2-2025 • Monday

organic chemistry

Ch-1

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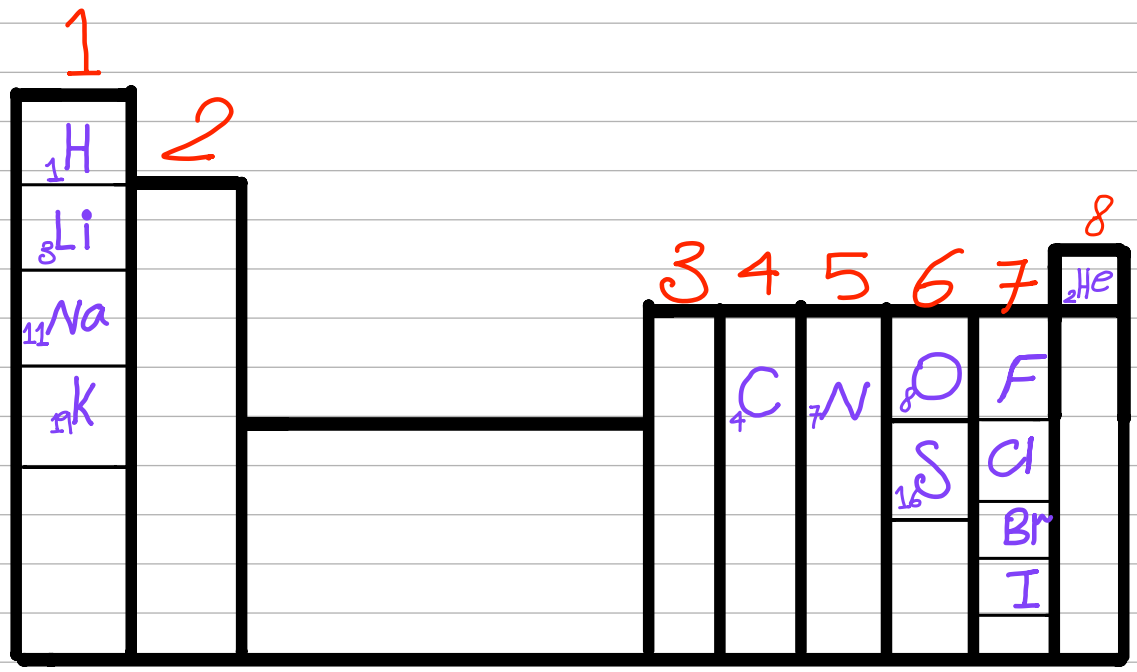
•Notes of the lecturer.

•These slides aren't sufficient for the examination purposes.

•The required things from the periodic table in our course to the last lecture

• Approximate shape.



columns (Groups)

Raws (Periods)

In the periodic table, there are:

metals ↔ main metalic elements (main elements) • like: Li • Na • Mg ...

metals ↔ Transition metals • like: Cs • Zn • Cu ...

Non-metals • like: F • I • Br • Cl • N • O ...

Metaloids • like: Sb • Ge • Si ...

•The number of valence electrons is equivalent to the number of the group.

- metals → Lose electrons.
- non-metals → Gain electrons.

$-\delta \rightarrow$ Negative Partial charge.

$+\delta \rightarrow$ Positive Partial charge.

Chemical bonds

Ionic

metal–Non-metal

like:

$Na^{+\delta}CN^{-\delta}$

$K^{+\delta}SH^{-\delta}$

$Na^{+\delta}OCH_3^{-\delta}$

Catoions ← → Anoions

(In our course ignore(neglect) them)

The total partial charge is $(-\delta)$

•Note: $-\delta$ in OCH_3 refers to (O) and in the same way in both $CN^{-\delta}$ and $SH^{-\delta}$

Covalent (Molecular)

- non-metal + non-metal
- non-metal + metaloid

Polar

like: C–Cl, O–H, N–H, C–Br

Non-Polar

like: C–C, C–H, Cl–Cl, H–H

According to the:

Electronegativity

Electronegativity: It is the ability of an atom to pull (attract) the bond's electrons to its own side as much as it can for the longest possible time.

• Too helpful chain:

Electronegativity →

$I < Br < Cl < N < O < F$

Electronegativity in the periodic table:

Increases →

Increases ↑

• If there isn't any difference in electronegativity between covalently bonded atoms, then the covalent bond is non-Polar and vice versa.

• Bond length: distance between two nuclei of atoms.

Bond length is inversly proportional with the strength of th bond (Energy bond)

Bond length →

C–C < C=C < C≡C

→ The strength of the bond

•Polarity of the bond is linearly proportial with the difference in the electronegativity.

•The least Polar bond is:

C–I, C–O, C–Br, O–H → the highest one.

The least difference in electronegativity.

•The most Polar bond is:

C–O, C–F, C–N

The highest difference in electronegativity