

Exercise walk-through

2.1

Types of Chemical Bonds

AP Chemistry

Types of chemical bonds

A **chemical bond** forms by what atoms do with valence electrons:

- **ionic** – metal **transfers** to nonmetal
- **covalent** – two nonmetals **share**
- **metallic** – a shared electron sea



Network solids bond in giant lattices

Exercises 2.1·2.3

2.1 State the bond type in KBr (K is a metal, Br a nonmetal).

[1]

2.2 Classify the bond in O₂ as polar or nonpolar covalent, with a reason.

[2]

2.3 For a bond between elements with $\Delta\text{EN} = 2.1$, state the likely bond type.

[1]

Exercises 2.1-2.3

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2.1

- Ionic

2.2 Classify the bond in O₂ as polar or nonpolar covalent, with a reason. [2]

2.2

- Nonpolar covalent – two identical atoms, so $\Delta\text{EN} = 0$ and the electrons are shared equally

2.3 For a bond between elements with $\Delta\text{EN} = 2.1$, state the likely bond type. [1]

2.3

- Ionic

Exercise 3.1

3.1 Which compound is most likely to contain **ionic** bonds?

[1]

☐

A CO_2

B CH_4

C MgO

D N_2

Exercise 3.1

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[1]

☐

A CO_2

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D N_2

3.1 C

- MgO is a metal + nonmetal, so it is ionic; the others are nonmetal–nonmetal (covalent)

Exercise 3.2 (a)

3.2 Consider the bonds in HF and F₂ (electronegativities: H 2.1, F 4.0).

(a) Find ΔEN for each.

[2]

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(a) Find ΔEN for each.

[2]

(a)

- HF: $|4.0 - 2.1| = 1.9$; F₂: 0

Exercise 3.2 (b)

3.2 Consider the bonds in HF and F₂ (electronegativities: H 2.1, F 4.0).

(b) Classify each bond.

[2]

Exercise 3.2 (b)

3.2 Consider the bonds in HF and F₂ (electronegativities: H 2.1, F 4.0).

(b) Classify each bond.

[2]

(b)

- HF polar covalent (or borderline ionic); F₂ nonpolar covalent

Exercise 3.3

3.3 Explain, in terms of electrons, how metallic bonding differs from ionic bonding. [2]

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3.3

- In metallic bonding the electrons are **delocalized** and shared across all the metal atoms (a "sea"); in ionic bonding electrons are **transferred** to form fixed + and – ions held by electrostatic attraction