What are Chemical Bonds?

Worksheet

A chemical bond is the attractive force between atoms caused by electron sharing (covalent), electron transfer (ionic), or a shared 'sea' of electrons (metallic), which lowers the overall energy of the system.

Questions

1. A bond between a metal and a nonmetal, formed by electron transfer, is called

A) Covalent
B) Ionic
C) Metallic
D) Hydrogen

2. In a covalent bond, electrons are

A) Transferred completely
B) Shared between atoms
C) Removed entirely
D) Never involved

3. Which best describes a metallic bond?

A) Electrons shared between two atoms only
B) Ions held by electrostatic attraction
C) A 'sea' of delocalized electrons shared by many metal atoms
D) No electrons involved at all

4. Which compound is held together by a covalent bond?

A) NaCl
B) MgO
C) HO
D) KBr

5. Explain how sodium (Na) and chlorine (Cl) form an ionic bond in NaCl.

6. Explain how two hydrogen atoms form a covalent bond in H.

7. Classify the bond in MgO (magnesium oxide) and CO (carbon dioxide).

8. Define: What is an ionic bond?

9. Define: What is a covalent bond?

10. Define: What is a metallic bond?

Answer Key

1. B) Ionic - Metal + nonmetal, with electron transfer, forms an ionic bond.

2. B) Shared between atoms - Covalent bonds form by sharing electron pairs.

3. C) A 'sea' of delocalized electrons shared by many metal atoms - Metallic bonding involves electrons delocalized across a lattice of metal cations.

4. C) HO - HO forms between two nonmetals (H and O), sharing electrons covalently.

5. Na has 1 valence electron; Cl has 7 valence electrons Na transfers its 1 electron to Cl Na becomes Na (stable, full shell); Cl becomes Cl (stable, full shell) Opposite charges attract ionic bond forms

6. Each H atom has 1 electron and needs 2 to fill its shell Both atoms share their single electrons in a shared pair The shared electron pair holds the atoms together covalent bond

7. MgO: magnesium (metal) + oxygen (nonmetal) electrons transfer ionic bond CO: carbon (nonmetal) + oxygen (nonmetal) electrons shared covalent bond

8. A bond formed when electrons transfer from a metal to a nonmetal, creating oppositely charged ions that attract each other.

9. A bond formed when two nonmetal atoms share one or more pairs of electrons.

10. A bond where metal atoms share a 'sea' of delocalized electrons, giving metals conductivity and malleability.