What is Ionic Bonding?

Worksheet

Ionic bonds form when a metal atom loses electrons to a non-metal, creating a cation and an anion that attract each other electrostatically. The bond is very strong in solid form but breaks easily in water.

Questions

1. Ionic bonds form when one atom ___ electrons to another.

A) shares
B) transfers
C) orbits
D) repels

2. Which compound is ionic?

A) HO
B) CO
C) NaCl
D) O

3. Why do ionic compounds have high melting points?

A) Weak hydrogen bonds
B) Strong covalent bonds
C) Strong electrostatic forces
D) No bonding

4. In the compound CaO, what is the charge on Ca?

A) +1
B) +2
C) 2
D) Neutral

5. Write the ionic bond formula when magnesium (12p, loses 2e) bonds with oxygen (8p, gains 2e).

6. Aluminum (Al, 13 protons) loses 3 electrons to fluorine (F, 9 protons). What compound forms?

7. In CaCl, identify the cation and anion, and their charges.

8. Define: What is an ionic bond?

9. Define: How do ionic bonds differ from covalent bonds?

10. Define: Why is ionic bonding strong in solids?

Answer Key

1. B) transfers - Ionic bonding involves electron transfer, creating a cation and an anion.

2. C) NaCl - NaCl (sodium chloride) is ionic. Others are covalent or molecular.

3. C) Strong electrostatic forces - Ionic compounds have strong electrostatic attractions in their 3D lattice.

4. B) +2 - Calcium (metal) loses 2 electrons Ca. Charge = +2.

5. Mg loses 2 electrons Mg (12p, 10e) O gains 2 electrons O (8p, 10e) Electrostatic attraction between Mg and O Ionic compound: MgO

6. Al loses 3 electrons Al (13p, 10e) F gains 1 electron F (9p, 10e) For charge balance: 1 Al bonds with 3 F Compound: AlF

7. Ca = Calcium (metal) loses 2 electrons Ca Cl = Chlorine (non-metal) gains 1 electron Cl 1 Ca bonds with 2 Cl (charge balance: +2 and 21)

8. An electrostatic attraction between a positively charged cation and a negatively charged anion.

9. Ionic bonds form by electron transfer (creating ions); covalent bonds form by electron sharing.

10. Each ion is surrounded by multiple oppositely charged ions in a 3D crystal lattice.