

Name _____ Block _____

Types of Bonding and Intermolecular Forces

A. Intermolecular Forces

To explain gas behavior according to the Ideal Gas Law, the kinetic molecular theory assumes that molecules exert no attractive forces on each other. To explain liquid behavior and phase changes, intermolecular forces must be taken into account.

1. The forces between molecules include dispersion forces (for nonpolar molecules), dipole-dipole forces (for polar molecules), and hydrogen bonding (for molecules in which hydrogen is attached to fluorine, oxygen, or nitrogen). Indicate, for each of the following substances, the intermolecular force or forces involved.

- | | |
|--|---|
| a. C ₇ H ₁₆ _____ | d. CH ₃ NH ₂ _____ |
| b. Ne _____ | e. CH ₃ OCH ₃ _____ |
| c. CH ₂ Cl ₂ _____ | f. H ₂ O _____ |

2. Which of the above substances are most likely to exist as gases at 25°C and 1 atm?

3. What is the relationship between the strength of the intermolecular forces in a substance and the boiling point of that substance?

4. Water has a high boiling point for a substance of its molecular weight. Account for this in terms of its intermolecular forces.

6. Tell which member of each of the following pairs of compounds you would expect to have the higher boiling point. Explain why.

a) SO₂ or CO₂

b) HF or HI

c) O₂ or N₂

B. Classifying Solids

1. Depending upon the arrangements of particles within them, solids can be grouped into a number of classes. These classes include metallic solids, covalent network solids, molecular solids, ionic solids, and amorphous solids. For each of the properties in the following table, describe each type of solid as high, medium, low, or variable.

Type of Solid	Melting Point	Malleability	Conductivity
Metallic			
Covalent Network			
Molecular			
Ionic			