

Types of Compounds and Intermolecular Forces

Read the descriptions of the following substances and answer the questions that follow.

1. The substance is a soft solid at -250°C but a gas at room temperature. It is nonconducting and transparent. It is also insoluble in water.

a. Bond Type (circle one): ionic covalent

b. Type(s) of intermolecular forces (circle all that apply):

dipole-dipole dispersion forces hydrogen bonding covalent network

c. Briefly explain your selections (how did you make your decision?).

Very low melting point. Dispersion is
weakest attraction & would be low melting
points/gases.

2. This substance is a solid at room temperature. When pressure is applied, the compound breaks apart. The compound does not conduct in its solid form. Although it has a high melting point, it does conduct in its liquid form. The substance does not dissolve in nonpolar solvents but will dissolve in polar solvents.

a. Bond Type (circle one): ionic covalent

b. Type(s) of intermolecular forces (circle all that apply):

dipole-dipole dispersion forces hydrogen bonding covalent network

c. Briefly explain your selections (how did you make your decision?).

Conducts only as a liquid. Brittle.

3. This substance is a liquid at room temperature and will boil at 140°C . It will not conduct as a liquid or solid. The compound will dissolve in water but not in oil.

a. Bond Type (circle one): ionic covalent

b. Type(s) of intermolecular forces (circle all that apply):

dipole-dipole dispersion forces hydrogen bonding covalent network

c. Briefly explain your selections (how did you make your decision?).

all covalents (this is covalent - is a liquid, doesn't conduct)
have dispersion forces (except network solids)
would accept dipole-dipole or Hydrogen bonding

4. The final substance is again a solid with an extremely high melting point. It is hard but brittle. This substance is not a conductor in any form and is insoluble in water.

a. Bond Type (circle one): ionic covalent

b. Type(s) of intermolecular forces (circle all that apply):

dipole-dipole dispersion forces hydrogen bonding covalent network

c. Briefly explain your selections (how did you make your decision?).

doesn't dissolve or conduct

solid but brittle, extremely high mp.

↑

5. What is the strongest intermolecular force present for each of the following compounds?

a. H₂O hydrogen bonding

b. CCl₄ dispersion

c. NH₃ ≠ hydrogen bonding

d. CO₂ dispersion

e. PCl₃ dipole-dipole

f. N₂ dispersion

g. C₂H₆ dispersion

h. CH₂O dipole-dipole

i. CH₃OH hydrogen bonding

j. BH₃ dispersion

6. Rank the following by from lowest to highest anticipated boiling point: C₂H₄, CH₄, Ne, H₃COCH₃ (O is the central atom).

Ne, CH₄, C₂H₄, H₃COCH₃

