Comparing Ionic and Covalent Substances

Aim

- compare the properties of ionic and covalent substances

Notes

Ionic solids

- ★ hard
- ★ brittle
- ★ high melting point
- ★ don't conduct electricity, but melt does
- ★ form electrolyte solutions in water (solutions that conduct electricity)
- ★ form crystals with regular geometric shapes that cleave along cleavage planes - salt

Covalent substances

- ★ Solids
  - ☆ Network solids - a large macromolecule held together by covalent bonds
    - ★ hard
    - ★ brittle
    - ★ high melting point
    - ★ don't conduct electricity solid or melted
    - ★ form crystals with regular geometric shapes that cleave along cleavage planes - diamonds (C), sand (SiO_2)
  - ☆ Molecular solids - discrete molecules held together by intermolecular forces
    - ★ may be soft
    - ★ may have a low melting point
    - ★ don't conduct electricity solid or melted
    - ★ form electrolyte solutions in water (solutions that conduct electricity) if they are polar
- ★ Liquids
  - ☆ polar compounds dissolve best in other polar compounds (acids and water)
  - ☆ nonpolar compounds are often immiscible in water and dissolve better in nonpolar compounds (tar in gasoline)

Answer the questions below by circling the number of the correct response

1. Which of the following is NOT a characteristic of ionic crystals?
   (1) conduct electricity, (2) hard, (3) brittle, (4) high melting point.

2. Which of the following conduct electricity? (1) ionic solid
   (2) covalent solid (3) solution of an ionic compound (4) solution of
   a covalent compound

3. What type of crystal is diamond? (1) ionic (2) covalent
   (3) molecular (4) polar

4. Which type of solid is most likely to be soft? (1) ionic (2) covalent
   (3) molecular