

7.1 Bonds between Atoms

In Chapter 5, you looked at elements and compounds. You saw the kinds of particles they consist of (Figure 1.1).

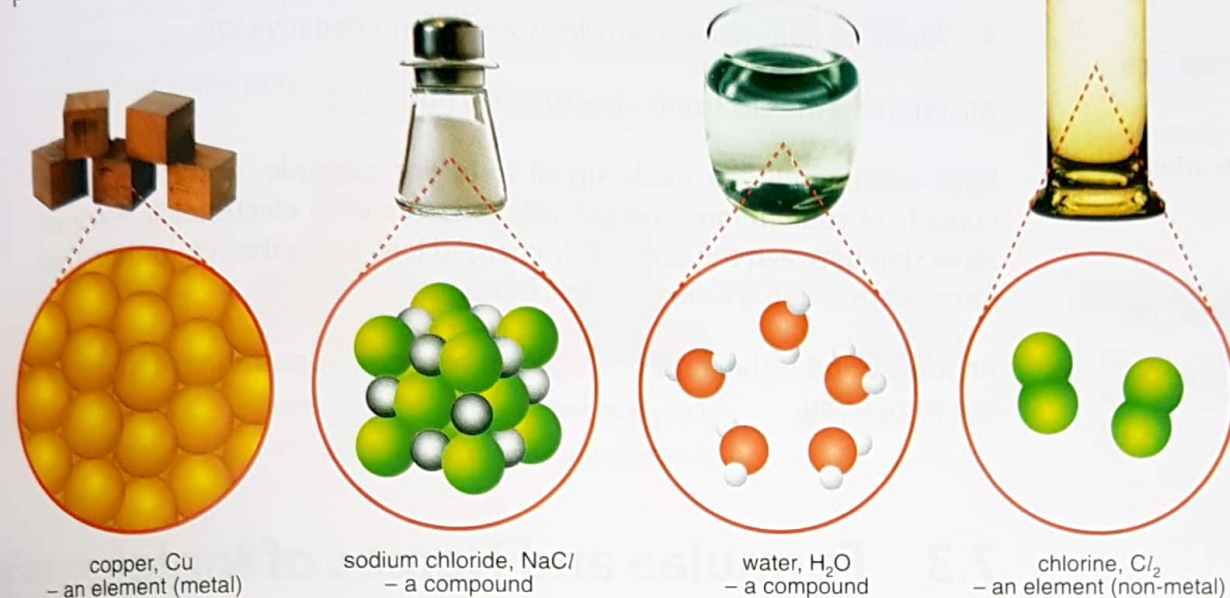


Figure 7.1 The models of some elements and compounds

In an element or compound, forces hold the particles together. For example, in a piece of copper, forces hold copper atoms together in the metal. In chlorine gas, forces hold two chlorine atoms together as one chlorine molecule. In sodium chloride, forces hold sodium and chloride ions together.

The force holding particles together is called a **chemical bond** (or simply, a **bond**).

There are three main ways of forming chemical bonds between atoms.

- **Ionic bonding** results when electrons are transferred from one atom to another, forming positive and negative ions.
- **Covalent bonding** results when atoms are joined together by sharing electrons, forming molecules.
- **Metallic bonding** is found only in metals.

In this chapter, you will also see how chemists use atomic structure and ionic theory to explain the formation of bonds in elements and compounds.

THINK TIME

- 1 Look at Figure 7.1.
 - (a) Which substances consist of
 - (i) atoms,
 - (ii) molecules, and
 - (iii) ions?
 - (b) Which substances do you think have
 - (i) ionic bonding,
 - (ii) covalent bonding, and
 - (iii) metallic bonding?
- 2 What do you think would happen if there were no bonds between particles?
- 3 (a) What are the electronic configurations for sodium and chlorine?
 - (b) Atoms of sodium and chlorine do not have stable electronic structures. Suggest how these atoms can get a stable electronic structure.