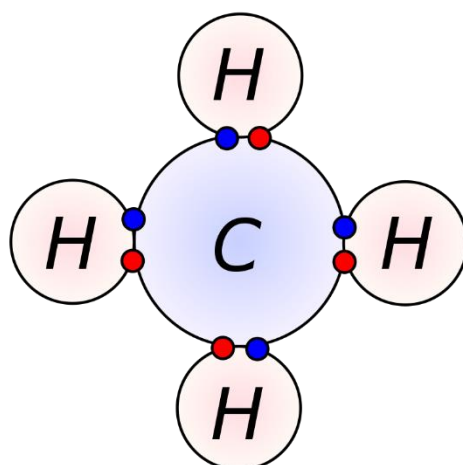




Covalent bonding

covalent bonding is a common type of bonding in which two or more atoms share valence electrons more or less equally. The simplest and most common type is a single bond in which two atoms share two electrons. Other types include the double bond, the triple bond, one- and three-electron bonds, the three-center two-electron bond and three-center four-electron bond.



- Electron from hydrogen
- Electron from carbon

Non-polar covalent bonds in methane (CH_4). The Lewis structure shows electrons shared between C and H atoms

A covalent bond may also be formed when two or more atoms of different non-metals share one or more pairs of valence electrons.

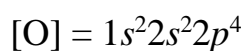
Properties of covalent solids

1. Covalent bonds are directional.
2. They exhibit varying physical properties. Eg. Diamond is the hardest substance with high melting point. tin is very soft and has low melting point
3. Covalent solids are hard and brittle and possess crystalline nature.
4. When compared with ionic solids, these solids have relatively low melting and boiling points.
5. Pure covalent solids are good insulators of electricity at low temperatures.
6. They are soluble in non polar solvents.

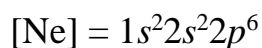
Ions and Ionic Compounds

Chemical Reactivity

Some elements are highly reactive, while others are not. For example, **Figure 1** compares the difference in reactivity between oxygen and neon. Notice that oxygen reacts readily with magnesium, but neon does not. Why is oxygen so reactive while neon is not? How much an element reacts depends on the electron configuration of its atoms. Examine the electron configuration for oxygen.



Notice that the $2p$ orbitals, which can hold six electrons, have only four. The electron configuration of a neon atom is shown below.



Notice that the $2p$ orbitals in a neon atom are full with six electrons