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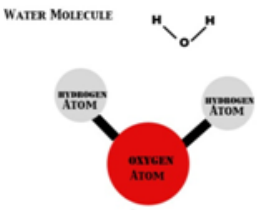
What Is a Molecule?

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Atoms and Molecules

An atom is the fundamental unit of matter. Atoms of most of the elements are not stable and therefore they are unable to exist independently. These atoms either form ions or combine with the same or other elements to attain a stable state. Molecules are the smallest particles of an element or compound which has the same properties as that of the substance.

They are self-sufficient to exist in a free state. A molecule is said to be formed when two or more than two similar or dissimilar atoms are held together by chemical bond. A chemical bond is formed by an exchange of electrons or by sharing of electrons between the atoms.



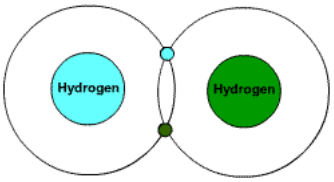
For example, a single drop of water contains millions and billions of water molecules in it.

Water molecule forms when two atoms of hydrogen and one atom of oxygen join together in sharing their electrons.

Types of molecules

Molecules are classified into two categories:

1. Molecule of an element
2. Molecule of compound



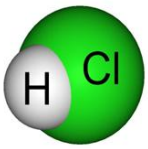
Molecules of element

The molecules of an element are formed by the same type of atoms.

The number of atoms forming a molecule of an element is known as its atomicity.

On the basis of atomicity, molecules are divided into

- **Monoatomic molecules**: when a molecule of element is made up of single atom, it is said to be monoatomic molecule. E.g., Helium, neon
- **Diatomic molecules**: diatomic molecule is made up of two same atoms. E.g.-H_2 and N_2
- **Triatomic molecules**: triatomic molecule is made up of three atoms. E.g., O_3 contains three atoms of oxygen.
- **Tetratomic molecules**: these molecules contain four atoms. E.g., P_4 contain four atoms of phosphorus.
- **Polyatomic molecules**: Molecules containing more than four atoms are polyatomic molecule. E.g., S_8 is a sulphur molecule containing eight atoms of sulfur

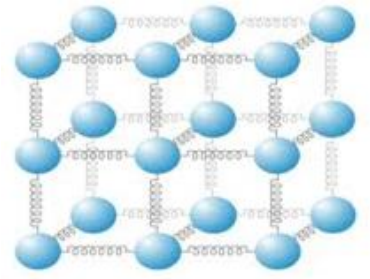


Molecules of a compound

A compound is said to be formed when two or more atoms of different elements combined together in a fixed proportion.

Example: Hydrogen chloride molecule (HCl) contains two different types of atoms, hydrogen and chlorine atom.

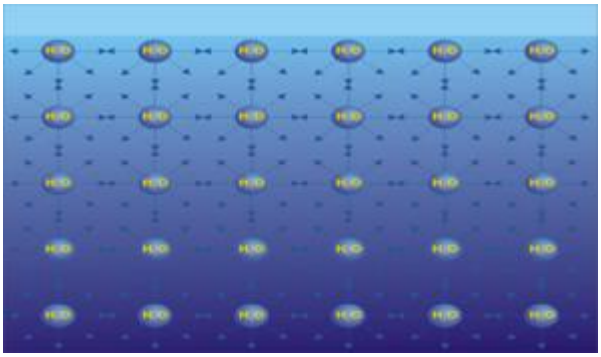
Arrangement of molecules in Solid, Liquid, and Gases



Arrangement of molecules in solid

Atoms ofsolids are tightly held together by a strong force so they cannot move from their places. They keep the molecules in fixed spatial arrangement.

The particles of solid are vibrating in their own place so they cannot move from their position. Because of these properties solids cannot be compressed and maintain their own shape. As the particles of solids are strongly held together by strong forces, it is not possible to pass through them.



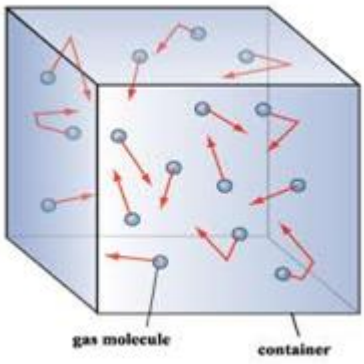
Arrangement of molecules in liquid

In liquid state, the intermolecular attractions keep the molecules in proximity. The particles are close together but not touching each other. The particles are arranged randomly and are roaming about in all directions.

The forces holding the particles are weaker than solids but stronger than gases. As the particles are moving randomly in all

the directions and changing their places all the time, they do not keep their own shape.

They acquire the shape of the container in which they are kept. The particles of liquid are close together so they cannot be compressed.



Arrangement of molecules in gas

In gaseous states, the molecules are apart from each other and have minimal intermolecular attractions between them.

They are moving very rapidly in different directions and are not arranged in specific pattern.

As they are so small and have negligible forces between them they can be easily compressed and flow in any direction.

Why are gases easily compressible?

Try to answer. Still need help? Want to know more about molecules?Click here to schedule live help from a certified tutor!

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Reference Links:

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- http://www.kibron.com/fileadmin/pictures/water.png
- http://www.hk-hy.org/contextual/heat/tep/trans/solid_state_model.gif
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