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CHEMICAL BONDS NOTES

Chemical Bond – a chemical bond is a force of attraction between two (or more) atoms. Chemical bonds are formed when atoms give, take, or share electrons with other atoms.

When 2 or more atoms form a chemical bond, the result is a molecule.

Molecule – any two (or more) atoms that are chemically bonded together.

Molecules are also elements if all the atoms that are bonded together are the same kind.

Ex. A brick of solid gold is nothing but gold atoms bonded together (it is only gold atoms)
A balloon full of hydrogen gas (H_2) (other than the balloon it is only hydrogen atoms)

Molecules are also compounds if there are at least two different kinds of atoms involved.

Ex. Water (H_2O) is a compound because it is made of Hydrogen (H) and Oxygen (O) atoms
Glucose ($C_6H_{12}O_6$) is a compound made of Carbon (C,) Hydrogen (H,) and Oxygen (O)

There are 3 different types of chemical bonds:

1. Covalent Bonds – covalent bonds are formed when atoms share electrons.

Not all atoms share electrons the same way. Thus, covalent bonds come in two types:

- polar covalent bonds – are formed when atoms do not share electrons equally. A “sharer” and a “taker” form a polar, covalent bond

Ex. H_2O is a polar covalent bond because the electrons are around the oxygen more than the Hydrogen

- non-polar covalent bonds – are formed when atoms share electrons equally. Two “givers,” two “sharers,” a “giver” and a “sharer,” or two “takers” form non-polar, covalent bonds.

Ex. CH_4 is a non-polar covalent bond because the Hydrogens and Carbon share their electrons equally

2. Ionic Bonds – ionic bonds are formed when an atom (or atoms) gives away electrons to another atom(s) that take those electrons. A giver and a taker form an ionic bond.

Ex. Table salt ($NaCl$) is an example of an ionic bond. Na gives and Cl takes

- atoms in an ionic bond that give away their electrons become “+” (positive) ions
Ex. In salt sodium (Na) gives it’s electron to chlorine and becomes a “+” ion

- atoms in an ionic bond that take in electrons become “-” (negative) ions
Ex. In salt chlorine (Cl) takes an electron from sodium and becomes a “-” ion

3. Metallic Bonds – metallic bonds are formed when many metal atoms group together and share many electrons.

Ex. A brick of silver (Ag) would be made of millions of silver atoms sharing millions of electrons.

