
Bonding

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Compounds

Compounds are formed when two or more atoms join together by either sharing (covalent bonding) or transferring electrons (ionic bonding). This will depend on how much attraction there is for additional electrons – electronegativity. The electrons that are shared or transferred are the outermost ones and are called the valence electrons.

Driving force

For simple ionic and covalent bonding the octet rule provides a simple model. Having 8 electrons in the outer s and p sublevels results in a lower energy situation.

Ionic and Covalent

Although there are several variations, the simplest classifications of bonding are that ionic compounds involve more transfer of electrons than sharing and covalent compounds involve more sharing than transfer.

Ionic compounds

Metals and nonmetals usually form compounds that involve a great deal of transfer of electrons because of their large difference in electronegativity. Thus these compounds are classified as primarily ionic.

When an atom loses or gains an electron it is called an ion. The loss of a negatively charged electron forms a positively charged cation. The gain of a negatively charged electron forms a negatively charged anion. Ionic compounds are held together by the attractions between the cations and anions that compose it. When an ionic compound dissolves in water it forms ions.

Properties

- 1. High MP**
- 2. Solubility in water**
- 3. Well-defined crystals**
- 4. Molten form conducts electricity as well as water solution**

Covalent compounds

Nonmetals bond with other nonmetals to form compounds classified as principally covalent since the electronegativity values are similar. It is the sharing of the electrons that holds these compounds together. When a covalently bonded compound dissolves in water it exists in the form of neutral molecules. Some of these molecules may ionize to give ions.

Properties

- 1. Most have low MP but some macromolecules have high MP**
- 2. Usually have poor water solubility**
- 3. Molten form does not conduct electricity, but solutions can give limited conduction**

Organic and Inorganic compounds

Another way to classify compounds is by the elements that compose it. Organic compounds contain the element carbon. There are a few carbon containing compounds that are not thought of as organic such as carbon dioxide.

Inorganic compounds contain other elements besides carbon.

Although carbon is only 1 of the over 110 elements there are millions of organic compounds and less than one million inorganic compounds.