

Element bond research paper

[Technology](#), [Development](#)



Assignment 3

A mixture is a substance that has molecules of different types. Constituents of mixtures could be either elements or compounds. The different constituents of a mixture exist together in a state whereby they are in contact with one another. However, they do not combine chemically. In addition, the individual constituents of a mixture retain their individual physical properties even after forming the mixture. It is possible to separate a mixture into its constituent elements by physical or mechanical means. The melting and boiling points of a mixture are not definite. They range from one figure to another. It is also possible to mix the constituent parts of a mixture in varying proportions. The formation of mixtures does not lead to a change in the internal energy of the final mixture. Mixtures are impure substances.

Compounds, on the other hand, are substances whose molecules consist of atoms of different elemental particles. The different elements have combined chemically to form the compound. The individual elements in a chemical compound have lost their individual chemical properties and have taken up the chemical properties of the compound. When elements combine to form compounds, the resulting compound may possess a physical state, which is different from that of the constituent elements. It is not possible to separate a chemical compound into its constituent elements by a physical or mechanical means. Chemical compounds have definite boiling and melting points. The constituent elements of a mixture can combine only in a fixed proportion. There could be a change in the internal energy of a compound formed by a chemical reaction. Compounds are pure substances.

2. Elements can no longer be broken down to simpler substances. They are in fact, the simplest form of substances. Compounds, on the other hand, consist of constituent elements that combine in a fixed proportion.

Therefore, application of heat to a pure element would not yield a new substance although; the state could change from either solid to liquid, liquid to gas or solid to gaseous state. Compounds, on the other hand can be broken down into their constituent elements by the application of heat. A flame test is to test if a substance is an element or a compound. The identification of the substance would depend on the color imparted on the flame.

3. The difference between ionic bonds and covalent bonds lie in the electro negativity of the constituent elements or compounds (Helmenstine, 2012).

Electro negativity is the ability of an individual atom to attract electrons. In ionic bonds, the individual atoms have a large difference in their electro negativity values. Ionic bonds occurs often times between chlorine and metals. This leads to formation of ionic crystals with both positively and negatively charged ions are in association (Helmenstine, 2012). The ionic bonds are not strong and break by hydrogenation or hydration.

Covalent bonds, on the other hand form when there is only a very small difference in the electro negativity value of the constituent atoms. Similar atoms often form covalent bonds (Helmenstine, 2012). There is complete sharing of electrons in covalent bonds in which each atom has completed its valence. This type of bond is more stable and is therefore more difficult to break, unlike ionic bonds (Helmenstine, 2012).

4. In ionic bonding, there is complete transfer of electrons from one of the

participating ions or elements to another participant. In the process of losing or gaining electrons, the atom becomes charged (Helmenstine, 2012). The process of losing electrons leads to becoming positively charged and the process of gaining electrons lead to becoming negatively charged. There is thereafter, an attraction between the positively charged atom and the negatively charged atom, leading to the formation of an ionic bond (Helmenstine, 2012). For example in the formation of sodium chloride, Sodium has a lone electron in its outer shell. The electrostatic pull between this outer electron and its nucleus is weak. Being the lone electron, it is easily lost. Chlorine on the other hand, is deficient of one electron in its outer shell. Because of this, it easily gains an electron in order to complete its octet configuration. This is also the aim for Sodium losing its outer electron - so that it can attain an octet configuration and become more stable. Sodium loses one electron to chlorine and this makes it positively charged. Chlorine gains one electron from sodium to become negatively charged. This leads the formation of charged molecules, which attract to one another. Both molecules thereafter react to form a compound of Sodium Chloride.

Another example of a covalent and is that between potassium and Chlorine. Potassium also has a lone electron in its outer shell, which it loses to become positively charged. This lost electron is gained by chlorine, which is deficient of one electron in its outer shell. Chloride becomes negatively charged. With the loss of the electron in its outer shell, potassium also attains the octet configuration and becomes smaller while chlorine gains an electron to attain the octet configuration and subsequently become bigger. Both atoms attract to one another to form the compound potassium chloride in an ionic bond.

6. Covalent bonds form between atoms by the sharing of electrons. Two or more elements have a similar tendency for electrons, generally to gain electrons come together to form the covalent bond.

An example is the bond formed between two hydrogen atoms. Each hydrogen atom has one valence electron in its outer shell. Since the capacity of the outer shell is just two electrons, it is easy for two hydrogen atoms to come together to share their lone electron. Each hydrogen atom reacts with another hydrogen atom to form the diatomic hydrogen molecule. This establishes the stability of the outer shell of the electrons, which fills up, thereby making it a stable diatomic molecule.

Covalent bonds also form between different atomic molecules. This type of covalent bonding is a polar bond because the electrons divide unequally among the constituent atoms. A polar covalent bond forms when electrons divide unequally between two atomic molecules. For example, the bond formed between Hydrogen and Oxygen to form water molecule. Hydrogen has one valence electron in its outer shell while Oxygen is deficient of two electrons in its outer shell. Each of the lone Hydrogen electrons is by both Oxygen and Hydrogen. With this, Oxygen is able to complete its outer electron shell by sharing two hydrogen electrons and Hydrogen is able to complete its outer electron shell. Both atoms are now stable in a polar covalent bond.

Covalent bonds can either polar or non-polar depending on the constituent atoms participating in the bond. If the covalent bond forms between the same elemental atoms, it is a non-polar covalent bond. However, if the

covalent bond forms among atoms of different elements, the covalent bond formed is a polar covalent bond.

References

A M, Helmenstine (2012). What is the Difference Between an Ionic Bond and Covalent Bond?. About. com Chemistry. Retrieved on 13th May 2012 from <http://chemistry.about.com/od/chemistrystudentfaqs/f/bondtypes.htm>
(Helmenstine, 2012)