

Physical science- assignment 3 essay example

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XYZ College/University

Difference between a compound and a mixture

A compound is a pure substance which contains atoms of two or more different elements that are chemically bonded together; the physical and chemical properties of this compound differ from those of its constituent elements. The components of a compound are always present in fixed proportions and cannot be separated by simple physical methods. Whereas, a mixture may be composed of multiple elements or compounds, but they are not chemically bonded. The components of a mixture are not present in fixed proportions. The properties of a mixture are the average properties of its constituent elements and the components can be separated by simple physical methods.

Difference between a compound and an element

There are two types of pure substances, elements and compounds. If we have a pure substance, we can use chemical methods to try and further decompose the substance. Successful further decomposition of a pure substance will result in it being originally a compound. If the substance does not decompose, it will be an element. An element contains only one type of atoms which cannot be broken down by chemical techniques such as cooling, heating, freezing, electrolysis and reacting with other chemicals.

Difference between Ionic and Covalent bonds

McHale(2007) explains that a bond which is formed from the forces of attraction between positively charged ions (cations) and negatively charged ions (anions) is known as an ionic bond. The cation originally donates

electrons to form an anion. By doing so, both the atoms attain a noble gas electronic configuration.

Whereas, a covalent bond is formed when two atoms are involved in the sharing of electrons. Hence, the bonded atoms attain noble gas electronic configuration.

There are two types of covalent bonds: polar and non-polar. Polar or charged covalent bonds are formed when the atoms being bonded have unequal affinity for the electrons. The overall charge on the compound can either be positive or negative. Non-polar or uncharged covalent bonds depict bonded atoms having equal attraction for the shared electrons. This results in the overall compound having a neutral charge. (Mchale, 2007)

Figure 1: Difference between an ionic and a covalent bond

Explain why ionic compounds

are formed when a metal from the left side of the periodic table reacts with a nonmetal from the right side?

Metals from the left side of the periodic table are strongly electro-positive, which means they readily give up their electrons. Whereas, non-metals from the right side of the periodic table are strongly electro-negative and hence, readily accept electrons. In order to attain a noble gas electronic configuration, metals give up their electrons to become positively charged ions known as cations. Non-metals gain electrons to become negatively charged ions known as anions. The cations and anions are then bonded together by the transfer of electrons, forming an ionic compound.

Two examples are Potassium Bromide and Calcium Chloride.

Explain why covalent bonds

are formed when nonmetals from the right side of the periodic table bond with each other?

When two non metals from the right side of the periodic table having similar electro-negativities are bonded, the type of bond is known as a covalent bond. Neither of the constituent atoms are capable enough to attract electrons from the other. Hence, for the attainment of a noble gas electronic configuration and bonding they have to share their electrons with others. This case is prevalent in the nonmetals from the right side of Mendeleev's periodic table.

Two examples are : Phosphorous(V) Chloride and Chlorine

References

McHale, M. (2007, October 5). Bonding 07. Retrieved from the Connexions Web site: <http://cnx.org/content/m15205/1.4/>

Alberts, B. (2004). Essential Cell Biology (2nd ed.) New York, NY : Garland Science Publishers