Classification of matter pdf

Chemists study the structures, physical properties and chemical properties of material substances. They consist of matter, which is everything that occupies space and has mass. Gold and iridium are matter, as are peanuts, people and postage stamps. Smoke, smog and laughing gas are matter. Energy, light and sound, however, do not matter; ideas and emotions also don't matter. The mass of an object is the amount of matter it contains. Do not confuse the mass of an object with its weight, which is a force caused by gravitational pull that acts on an object. Mass is a fundamental property of an object that does not depend on its location. In physical terms, the mass of an object is directly proportional to the force needed to change its speed or direction. A more detailed discussion of the differences between weight and mass and the units used to measure them is included in Basic Skills 1 (section 1.9). Weight, on the other hand, depends on the location of the object. The astronaut, whose weight is 95 kg weighs about 210 pounds on Earth, but only about 35 pounds on the moon because the gravitational force he or she experiences on the moon is about one-sixth of the force tested on Earth. For practical purposes, weight and mass are often used interchangeably in laboratories. Since gravity is considered to be the same everywhere on the Earth's surface, 2.2 pounds (weight) is 1.0 kg (mass), regardless of the location of the laboratory on Earth. Solids are relatively rigid and have fixed shapes and volumes. The stone, for example, is hard. In contrast, liquids have fixed volumes but flow to take the shape of their containers, such as a drink in a can. Gases, such as air in a car bus, have neither fixed shapes nor fixed volumes and expand to fully fill their containers. While the volume of gases depends heavily on their temperature and pressure (the amount of force exerted on the area), the volume of liquids and solids is virtually independent of temperature and pressure. Matter can often change from one physical state to another in a process called physical change. For example, liquid water can be heated to form a gas called steam, or steam can be cooled to form liquid water. However, such changes in the condition do not affect the chemical composition of the substance. A pure chemical is any substance that has a fixed chemical composition and characteristic properties. Oxygen, for example, is a pure chemical that is colorless, odorless gas at 25 degrees Celsius. Very few samples of the substance consist of pure substances; instead, most of them are mixtures that are combinations of two or more pure in variable proportions in which individual substances retain their identity. Air, tap water, milk, milk, cheese, bread and dirt are all blends. If all parts of the material are in the same condition, have no visible boundaries and are homogeneous in everything, the material is homogeneous. Examples of homogeneous mixtures are the air we breathe and the tap water we drink. Homogeneous mixtures are also called solutions. Thus, air is a solution of nitrogen, oxygen, water vapor, carbon dioxide and a number of other gases; tap water is a solution to a small amount of several substances in the water. However, the specific compositions of both of these solutions are not fixed, but depend on both the source and the location; for example, the composition of tap water in Boise, Idaho, is not the same as the composition of tap water in Buffalo, New York. While most of the solutions we face are fluid, solutions can also be solid. The gray matter, still used by some dentists to fill dental cavities, is a complex solid solution that contains 50% mercury and 50% powder, which contains mostly silver, tin and copper, with little zinc and mercury. Solid solutions of two or more metals are commonly referred to as alloys. If the composition of the material is not quite homogeneous, it is heterogeneous (for example, chocolate dough for cookies, blue cheese and dirt). Compounds that appear to be homogeneous are often considered heterogeneous after microscopic examination. Milk, for example, seems homogeneous, but when examined under a microscope, it clearly consists of tiny balls of fat and protein scattered in the water. The components of heterogeneous mixtures can usually be separated by simple means. Solid-liquid mixtures, such as sand in water or tea leaves in tea, are easily separated by filtration, which consists of passing the mixture through a barrier, such as a strainer, with holes or pores that are smaller than particulate matter. Basically, mixtures of two or more solids, such as sugar and salt, can be separated by microscopic examination and sorting. More complex operations are usually necessary, although, for example, when separating gold nuggets from river gravel by panning. The first solid material is filtered from river water; the solids are then separated by the inspection. If gold is embedded in the rock, it may have to be isolated using chemical methods. Figure :(PageIndex{2}: Heterogeneous mix. Under the microscope, whole milk is actually a heterogeneous mixture consisting of fat globules and protein scattered in water. The figure used with the permission of Wikipedia homogeneous mixtures (solutions) can be divided into their constituent substances by physical processes that rely on differences in certain physical properties, such as differences in their boiling points. Two of these methods of separation are distillation and crystallization. Distillation uses differences in volatility, measure how easily the substance is converted into gas at this temperature. A A a distillation machine to separate a mixture of substances, at least one of which is a liquid. The most volatile component first boils and condenses back into the liquid in a water-cooled capacitor from which it flows into the receiving flask. If the solution of salt and water is distilled, for example, a more volatile component, pure water, is collected in the receiving flask, while salt remains in the distillation flask. Figure : (PageIndex{3}): Distillation of a table salt solution in water. The solution of salt in water is heated in a distillation flask until boiling. The resulting vapor is enriched into a more volatile component (water), which condenses into the liquid in a cold capacitor and then collected in the receiving flask. Blends of two or more liquids with different boiling points can be separated by a more complex distillation apparatus. One example is the processing of crude oil into a number of useful products: aviation fuel, gasoline, kerosene, diesel and lubricants (in an approximate way to reduce volatility). Another example is the distillation of alcoholic beverages such as cognac or whiskey. (This relatively simple procedure caused more than a few headaches for the federal authorities in the 1920s during the prohibition era, when illegal mice spread to remote regions of the United States!) Crystallization separates the mixture based on differences in solubility, a measure of how much solid remains dissolved in a given amount of specified liquid. Most substances are more soluble at higher temperatures, so a mixture of two or more substances can dissolve at high temperature and then cool easily. In addition, a liquid called solvent can evaporate. In any case, the least soluble of dissolved substances, the one that is least likely to remain in the solution, usually forms crystals in the first place, and these crystals can be removed from the remaining solution by filtration. Figure (PageIndex{4}): Sodium acetate crystallization from a concentrated sodium acetate solution in water. The addition of a small seminal crystal (a) causes the compound to form white crystals that grow and eventually occupy most of the flask. The video can be found here: www.youtube.com/watch?v=BLq5NibwV5g mixtures can be divided into pure substances that can be either elements or compounds. An element such as gray, metallic sodium, is a substance that cannot be broken down into simpler chemical changes; the compound, such as white crystalline sodium chloride, contains two or more elements and has chemical and physical properties that are usually different from the elements it consists of. With a few exceptions, a particular connection has the same elementary composition (the same elements in the proportions) proportions) its source or history. The chemical composition of the substance changes in a process called chemical change. The conversion of two or more elements, such as sodium and chlorine, into a chemical compound, sodium chloride, is an example of chemical changes often called chemical reactions. At present, 118 elements are known, but of these 118 elements, millions of chemical compounds have been produced. Known items are listed in the periodic table. Figure (PageIndex{5}: Decomposing water into hydrogen and oxygen using electrolysis. Water is a chemical compound; hydrogen and oxygen are elements. Typically, the reverse chemical process breaks down the compounds into their elements. For example, water (connection) can be decomposed into hydrogen and oxygen (both elements) by a process called electrolysis. In electrolysis, electricity provides the energy needed to separate the connection into its constituent elements (Figure No (PageIndex{5})). A similar technique is used on a huge scale to produce pure aluminum, an element from its des, which are mixture compounds. Because electrolysis requires a lot of energy, the cost of electricity is by far the largest cost incurred in the production of pure aluminium. Thus, aluminium processing is cost-effective and environmentally sound. The overall organization of matter and the methods used for individual blends are summed up in the picture (PageIndex{6}). Figure (PageIndex{6}): Relationships between the types of matter and the methods used for a separate sample of mixtures (PageIndex{1})) identify each substance as a compound, element, heterogeneous mixture or homogeneous mixture (solution). Filtered tea freshly squeezed orange juice is a compact disk aluminum oxide, a white powder that contains a 2:3 ratio of aluminum atoms and selenium oxygen Given: the chemical Asked: its Classification Strategy: Decide whether the substance is chemically pure. If it is pure, the substance is either an element or a compound. If a substance can be divided into its elements, it is a compound. If the substance is not chemically pure, it is either a heterogeneous mixture or a homogeneous mixture. If its composition is homogeneous in everything, it is a homogeneous mixture. Solution Tea is a solution of compounds in water, so it is not chemically clean. It is usually separated from the tea leaves by filtration. B Because the composition of the solution is homogeneous in everything, it is a homogeneous mixture. Orange juice contains solid particles (pulps) as well as liquids; It is not chemically clean. B Because its composition is not homogeneous in everything, orange juice is a heterogeneous mixture. A CD is a solid material that contains more than one element, with regions of different compositions, along its edge. Therefore, the CD is not chemically clean. B Regions Regions the composition indicates that the CD is a heterogeneous mixture. Aluminium oxide is one, chemically pure compound. Selenium is one of the known elements. Exercise (PageIndex{1}) Identify each substance as a compound, element, heterogeneous mixture, or homogeneous mixture (solution). White wine mercury ranch-style salad dressing table sugar (sucrose) Response to the solution Answer B element Answer C heterogeneous mixture Answer D compound matter can be classified according to physical and chemical properties. Matter is all that occupies space and has mass. The three states of matter are solid, liquid and gas. Physical change involves the transformation of a substance from one state of matter to another, without altering its chemical composition. Most of the matter consists of mixtures of pure substances, which can be homogeneous (uniform in composition) or heterogeneous (different regions have different composition and properties). Pure substances can be either chemical compounds or elements. Compounds can be broken down into elements as a result of chemical reactions, but the elements cannot be separated into simpler substances by chemicals. The properties of substances can be classified as both physical and chemical. Scientists can observe physical properties without altering the composition of the substance, while chemical properties describe the tendency of the substance to undergo chemical changes (chemical reactions) that change its chemical composition. Physical properties can be intense or extensive. Intensive properties are the same for all samples; Not depending on the size of the sample. and include, for example, color, physical condition, and melting and boiling points. Extensive properties depend on the amount of material and include mass and volume. The ratio of two vast properties, mass and volume, is an important intense property called density. Density. classification of matter class 9. classification of matter class 11. classification of matter chart. classification of matter ppt. classification of matter pdf. classification of matter examples. classification of matter on the basis of chemical properties. classification of matter in chemistry

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