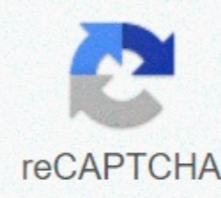




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## Spawn

The methods of separating homogeneous mixtures are all those which, without the use of scribbled chemical reactions, obtain the components or dissolved which make up the same phase; that is, from a liquid, solid or gas. Such homogeneous mixtures consist of solutions in which dissolved particles are too small to be distinguished with the naked eye. They are so small that there are no filters that are tight enough or selective enough to retain them while the solution goes through them. It also does not help to separate techniques such as centrifugation or magnetization. Illustrative example of how homogeneous mixtures can be separated in stages. Source: Gabriel Bolévar. The above is an example of how to divide sichaten into their components. The starting mixture (brown) is separated into two components, equally homogeneous (orange and purple). Finally, solvents (white) and the four respective pairs of solutes (red-yellow and red-blue) are obtained from the two resulting mixtures. Among the methods or techniques of separation of solutions we have evaporation, distillation, chromatography and fractional crystallization. Depending on the complexity of the mixture, several of these methods may need to be used until homogeneity is broken. The main methods of separation of mixtures – evaporation evaporation is the simplest method to separate homogeneous mixtures from a single dissolved. The simplest homogeneous mixtures are the solutions in which a single dissolver has been dissolved. For example, in the image above you have a colorful solution due to the absorption and reflection of visible light with the particles of your solution. If you have shaken well during your preparation, there will be no regions that are lighter or darker than others; they are all equal, uniform. Such colorful particles cannot be separated from the solvent by a mechanical method, so you need energy in the form of heat (red triangle) to achieve this. Thus, the colorful solution is heated to open air to speed up and allow solvent evaporation from your container. The volume separating the dissolved particles decreases and thus their interactions increase and slowly end in sedimentation. The end result is that the colorful solution remains at the bottom of the container and the solvent is completely evaporated. The disadvantage of evaporation is that, without the separation of dissolved, its goal is to eliminate the solvent by heating it to its boiling point. The remaining solid can consist of more than one dissolved body and is therefore required by other separation methods to define it in its isolated components. Distillation distillation Distillation distillation distillation is the method of separation or more commonly used homogeneous mixtures. Its use extends to molten salts or metals, condensed gases, solvent mixtures or organic extracts. Solute is usually a liquid whose boiling point differs several degrees from that of the solvent. If the difference between such boiling points is high (more than 70 oC), simple distillation is used; and if not, fractional distillation is performed. Both distillations have several assemblies or constructions as well as a different methodology for mixtures of different chemical nature (volatile, reactive, polar, apolar, etc.). In distillation, both solvents and dissolved ones are preserved, and this is one of their main differences in evaporation. However, the rotation combines these two aspects: a liquid-solid or liquid-liquid mixture, such as that of a dissolved and mixable oil, is heated to remove the solvent, but it is collected in another container while the solid or oil remains in the initial container. Air distillation Condensed air passes through cryogenic fractionated distillation to separate oxygen, nitrogen, argon, neon, etc. Air, a homogeneous gaseous mixture, is converted into a liquid in which nitrogen acts as a majority component theoretically as a solvent; and the other gases, also condensed, as liquid solutes. – chromatography chromatography, unlike other techniques, can not yield yields or remotely similar; that is, it is not useful for processing an entire mixture, but a negligible fraction of it. However, the information it provides is analytically valuable, as it identifies mixtures based on their composition and imittes. Paper or thin film chromatography. Source: Gabriel Bolévar. There are different types of chromatography, but the simplest explained in schools or pre-university courses is that of paper, the principle of which is the same as that developed on a thin layer of absorbent material (often silica gel). The image above shows that on a cup filled with water or a specific solvent, a paper with drops or dots of three selected pigments (orange, purple and green) was marked. The cup is kept closed so that the pressure is constant and saturated with the solvent vapours. The liquid then begins to rise through the paper and pulls the pigments. Pigment-paper interactions are not all the same: some are stronger, and some weaker. The more affinity the pigment feels for the paper, the less it will rise through the paper relative to the line originally marked. To It's the red pigment that feels the least solvent, while the yellow has barely risen because the paper retains it more. It is then said that the solvent is the movable phase, and the roll is the stationary phase. Illustrative example of fractional crystallization. Source: Gabriel Bolévar. And finally, you have fractional crystallization. This method could perhaps be classified as a hybrid as it is part of a homogeneous mixture to end a heterogeneous mixture. Suppose you have a resolution at which a green solid has dissolved (top image). Green particles are too small to separate manually or mechanically. It is also noted that the green solid is a mixture of two components and not a single composite of this color. Then a resolution is heated and left to rest when it cools down. It turns out that the two components, although very related to each other, their solubility in a given solvent are slightly different; therefore, one of the two begins to crystallize first and then the other. The green-blue component (in the middle of the image) is the first to crystallize while the yellow component remains detached. For green-blue crystals, they are filtered hot before the yellow crystals appear. When the solution cools down a little more, the yellow component crystallizes and further filtration takes place. Topics of interest Mix separation methods. Methods of separating heterogeneous mixtures. Mixtures: Components and types. Homogeneous mixtures. Heterogeneous mixtures. References Whitten, Davis, Peck & Stanley. Chemistry. (8th edition). CENGAGE Learning. Chelsea Schuyler. (2019). Chromatography, distillation and filtration: methods for separating mixtures. Study. Recovered from: study.com CK-12 Foundation. (16 October 2019). Methods for separating mixtures. Chemistry LibreTexts. Recovered from: chem.libretexts.org Good Science. (2019). Separation of mixtures. Recovered by: goodscience.com.au Clark Jim. (2007). Thin film chromatography. Recovered from: chemguide.co.uk mixing processThe mixing and phase separation methods are the different physical processes that make it possible to separate two or more ingredients from a mixture, using the different chemical properties of each individual. Note that these mechanisms are mixtures in which the ingredients retain their identity, and there have been no chemical reactions that permanently alter their properties or lead to new substances. Properties such as the point of the sied, density or size should be retained in the ingredients so that mixing methods can be applied. On the other hand, these methods work in homogeneous and heterogeneous mixtures, since they also do not imply a change in the identity of the ingredients that can be recovered more or less as they were before the mixture. Depending on the method used, original ingredients with higher or lower purity are achieved. Mixture separation is the physical process in which a mixture undergoes a treatment that allows it to divide and separate its components into at least two different substances during the separation process, while during the separation process the substances retain their identity without changing their chemical properties. Mixture separation is the physical process in which a mixture undergoes a treatment that allows it to divide and separate its components into at least two different substances during the separation process, while during the separation process the substances retain their identity without changing their chemical properties. In general, the separation method to be used is determined by the components present in the mixture and their special properties. Mixture separation methods based on the physical properties of its constituents The physical properties of matter are the properties of the substance which, when observed or measured, do not produce new chemical species, while the chemical properties are those which, when observed or measured, produce new chemical species in mixtures that produce changes in their internal structure. The most important properties are: solubility: solubility is defined as the maximum concentration of dissolved, which can be dissolved in a certain amount of solvent (solvent) at a certain temperature. This property allows you to determine whether precipitation forms when two solutions are mixed or when the solution is added to the solution. Temperature The boiling temperature of the fabrics is defined as the point at which they can cook at a total pressure of 1 atmosphere. When the pressure rises, the sieve point rises and the density of the generated gas phase increases, finally distinguishing itself from the liquid phase with which it is in equilibrium, if the temperature continues to rise, the critical temperature appears where there is no clear liquid phase above it. It is very important to know the temperature at which the transition from the liquid phase to the gas phase takes place, since the appropriate method of separation of mixtures can be determined, since e.B in the case of pure substances under solid pressure, both the boiling process and the evaporation process at a single temperature and, if the temperature rises, it remains until all the liquid is boiled. Density: Density is a physical property property and is defined as the size that expresses the relationship between the mass of a substance and the volume it occupies. Density fluctuations mainly depend on pressure and temperature, usually when the pressure increases, the density of each stable material increases even when the temperature rises, the density of the mixture decreases. Steam pressure: This is the equilibrium pressure exerted in the mixture when the evaporation and condensation process is balanced in a dynamic process. The molecules of a substance move at different speeds and when the temperature rises, some of the molecules present on the surface of the liquid have enough energy to ward off the force of attraction and become the gas phase. Viscosity: Viscosity is present in all liquids and is caused by collisions between particles of the liquid moving at different speeds, causing resistance to its movement. Liquids without viscosity or without viscosity coefficients are called ideal liquids and are usually superfluids at very low temperatures. Evaporation: This is the process by which molecules on the surface of liquids receive the energy needed to escape the forces of attraction that hold them to the mixture. The molecules with the highest energy enter the steam phase, resulting in a decrease in the liquid temperature. This process is endothermic. Importance of mixing processes The separation of substances from a mixture is important for chemicals and in many industries, since most materials, whether derived from natural products or produced in the laboratory, are mixtures of substances. The simple separation methods in the laboratory are the same as in industry. Each of them is of enormous practical importance. Special mention should be made of the distillation process, which is widely used in the food industry for the production of alcoholic beverages resulting from the fermentation of sugars and cereals or in the oil industry by fractional distillation. Reference should also be made to chromatography, which allows the analysis of toxic substances, and to evaporation, which makes it possible to obtain salt from seawater. Some artisanal methods used in the separation of mixture components, such as.B. cleaning of flours or sands, are also relevant. Centrifugation is widely used in hospitals to test urine and blood samples... Etc. Homogeneous mixing methods The separation processes for homogeneous mixtures are heterogeneous mixtures. This is because a simple application of mechanical force is not sufficient to remove particles, liquids or gases attached to another liquid or gas, so that other individual properties that can be used must be taken into account: solubility, polarity, and icing and solidification points. Distillation distillation is the method for cleaning liquids par excellence, which is based on the separation of the components of a liquid mixture by selective cooking and condensation. The distillation can be performed to achieve a complete separation of the components or to achieve a partial separation, which increases the concentration of a desired component. This technique uses the volatility differences between the components of the mixture to bring the system temperature to the lowest boiling range between the components, and separates this first component from the mixture, etc., until the desired result is achieved. There are numerous types of distillation, including simple distillation, fractional distillation, steam distillation, vacuum distillation and others. The latter is performed when the connections have very high boiling points, so it is preferable to reduce the pressure of the system to reach this point more easily at lower temperatures. Chromatography chromatography is a technique used in laboratories to separate a mixture. The mixture (or analine) dissolves into a liquid called the movement phase, which has the function of transporting it through a structure called the stationary phase. Since the individual compounds in the mixture migrate through this stationary phase at different speeds, the mixture is separated by components during this process, so that the proportion of the individual components of the mixture can be determined (if this is the intention) or simply cleans the analyte. The obtained chromatogram is used to interpret the results or the development of the separation process, observing the patterns drawn on it, to identify which components were separated in what ratio. The devices used for this process are called chromatographs, and there are techniques in gases and liquids, which implies that it can be done in columns or in flat form. Evaporation evaporation is an evaporation technique that occurs on the surface of a liquid when it enters the gas phase. This method is based on the application of energy to a mixture of liquids heated to the fuluation point of the liquid to be extracted (usually water), after which this component is separated from the mixture. After these will reduce its temperature due to an effect called evaporative cooling. Precipitation precipitation aims to form a solid in-A man in a solution; in fact, when solid particles form in a liquid solution, they are referred to as precipitated. Precipitation can be caused by adding precipitation agents to the sample, which cause precipitation to form at the bottom of the solution. Other times, this occurs as a side effect of a chemical reaction between two compounds. In the case of solids, there is a thermal aging of metals, a treatment that causes the deposition of metaestable phases within an alloy. They represent impurities that cure the material and prevent defects in its crystalline network. This process is mainly used in the production of pigments, in the elimination of salt from water, in water treatment and in some inorganic qualitative analyses. Recrystallization recrystallization is a chemical cleaning technique that allows to extract an undesirable component (which dissolves into a small amount) of a desired substance, usually a liquid solution. In this technique, the mixture is dissolved into a solvent that produces a saturated solution. This solution will allow to cool down, after which the solubility of the compounds in the solution will decrease. Finally, the desired compound forms solid crystals, leaves the impurities of the solution and can be extracted for future use. The purity of the crystalline precipitation can be increased by repeatedly passing this substance through the process, removing more and more impurities and increasing the concentration of the crystals of the desired compound. Images of mixing methods Videos of mixing methods

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