

43.1 Solution Composition & Properties

Chemistry

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction



Summarize your understanding of each paragraph.

While solutions compositions can be described in a variety of ways, a common way is to document the “**mass percent**.” The mass percent expresses the mass of solute present in a given mass of solution.

When a solution is described in terms of mass percent, the amount of solution is given in terms of its mass (*duh!*). But, ... sometimes it is more convenient to measure the **volume of a solution**, rather than to measure mass.

In the instance of measuring volume, chemists often describe a solution in terms of concentration. The expression “**concentration**” of a solution is the amount of solute in a given volume of solution.

The most commonly used expression of concentration is the **molarity** (M). Molarity described the amount of solute in moles and the volume of the solution in liters.

Read/Summarize Text



1. Read the passage.
2. Underline key expressions in each sentence.
3. Re-write each word (or expression) you underlined.
4. Summarize the passage.

Determining the Mass Percent Composition in an Aqueous Solution

Determining the composition of a solution is an important analytical and forensic technique. When solutions are made with water, they are referred to as being aqueous, or containing water. The primary component of a solution is referred to as the solvent, and the dissolved minor component is called the solute. The solute is dissolved in the solvent to make a solution. Water is the most common solvent in everyday life, as well as nearly all biological systems. In chemistry labs, the solvent may be another liquid, like acetone, ether, or an alcohol. The solute can be a liquid or a solid, but this experiment only addresses the determination of solids.

Video is available: JoVE Science Education Database. General Chemistry. Determining the Mass Percent Composition in an Aqueous Solution. JoVE, Cambridge, MA, (2018).

Re-write words you underlined

Using a complete sentence, summarize or rephrase the passage

Interpret the illustration



Based on your knowledge, describe (in words) what this image is communicating.

Example: Converting Between % by Mass and Molarity

An HCl solution is 26% HCl by mass and has a density of 1.125 g/mL. What is the molarity?

$$\text{Molarity} = \frac{\text{moles solute}}{\text{L solution}}$$
$$\text{Mass \%} = \frac{\text{mass solute}}{\text{mass solution}} \times 100\%$$

Adapted from unidentified YouTube video <https://goo.gl/images/3Xgxwu>

Describe (in your words) here ...

Covert Table into Graph



This experiment sought to find the mass percent of copper in brass.

The actual experiment used several different ways to calculate the findings (e.g., using molarity – and even a visual/qualitative inspection).

The actual report suggest *“It is likely that, due to the subjective nature of the visual test, that there was significant error.”*

Concentration	Absorbance
0.025 M	0.064
0.05 M	0.185
0.1 M	0.217
0.2 M	0.308
0.4 M	0.841

<https://noworkcited.wordpress.com/2015/10/09/lab-4-mass-percent-of-copper-in-bras/>

Use Table's Data to Create a Graph Here ...

Show-Off Your Smarts!



Instructions

- Complete as an individual or small group.
- Discuss your ideas/answers/responses in a small group.
- Prepare to present your responses to the class.

Q1. Postulate how this information might be applicable to a cattle rancher when comparing water samples from a pond year-over-year.

Q2. Describe (in general terms) how you might design an experiment to evaluate the cost vs. customer satisfaction of a newly formulated energy drink. Assume the mixture is aqueous and the cost of additional water is negligible.
