Name
Chemistry
States of matter

Solids
Q: Why is a solid a solid?
Q: What are the internal and external factors that affect a solid?
Q: How do I mathematically describe the composition of a solid?
Q: What is the difference between an empirical formula and a molecular formula?
Do: Must be able to determine the % mass from a formula.
Do: Must be able to convert a % mass to a formula.
Do: Must be able to convert an empirical formula to molecular formula.

Liquids
Q: Why is a liquid a liquid?
Q: What are the internal and external factors that affect a liquid?
Q: What factors affect the solubility of solids and gases in liquids?
Q: How do I mathematically describe how much stuff dissolves In a solvent?
Do: Must be able to make a solution.
Do: Must be able to calculate how to make a solution and fully utilize the molarity formula.
Do: Must be able mathematically calculate all parts of a dilution and physically make a dilution.
Q: Be able to interpret a Beer's law plot.
Do: Be able to do all aspects of stoichiometry with solutions :)

Gases
Q: Why is a gas a gas?
Q: What are the internal and external factors that affect gases?
Q: What are the factors that affect if something boils?
Q: Understand how the factors of a gas affect each other. (T, P, V)
Do: mathematically be able to solve problems using PV=nRT and Combined gas law.
Do: Be able to do all aspects of stoichiometry with gases :)

Solid

1. A 250mg pill containing aspirin actually has a mass 475mg. Meaning that the entire pill is not aspirin. What percent by mass of the pill is actually aspirin?

% Mass = mass x / total mass x 100

250/400 x 100 = 62.5%

2. Determine the percent mass of each element of $CaCl_2$.

Ca% 40/110 x 100 = 36%

Cl% 70/110 x 100 = 63%

40 / 35x2 } 110

3. $CaCl_2$ is commonly used as road salt to melt ice. If one buys a 50lb bag of road salt, how much mass of actual calcium is in the bag?

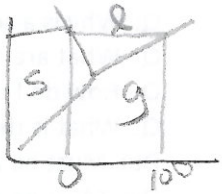
50lbs · .36 = 18lbs

4. Benzene has the formula of C_6H_6. What would the empirical formula of benzene?

CH

Solutions

5. Sketch a triple phase diagram of water. Label the locations of the solid, liquid, and gas. Also indicate the temperatures on the graph of the melting points and freezing points.



6. What ~~that we~~ can control relative to a substance being a liquid?

Properties

Pressure + temperature

7. If one wants to dissolve a gas into liquid how would you increase the solubility?

↓T ↑P

8. If one wants to increase the rate at which a liquid converts to a gas, Give two ways.

↑T ↓P T has to exceed Atmospheric pressure

9. What is ΔH vaporization?

Energy Needed to flip from (l) → (g)

10. I want to make a 100mL sample of .5M NaCl. Describe the steps.

$.5M = \frac{x}{.1L}$ $= .05mol \cdot \frac{58g}{1mol} = 2.9g$

1) measure 2.9g NaCl
2) Dissolve in 100 mL of H2O

11. Give an everyday example of where you would dilute something?

Making liquid drinks. - orange juice - Kool-Aid.

12. What is the difference between a qualitative test and a quantitative test?

Quantitative = give actual values / Qualitative is it present?

Gases

13. 1.5 L of CO_2 @ STP is dissolved in 4L of water. What is the molarity of the solution?

Need moles of CO_2 $PV = nRT$ $\frac{PV}{RT} = n = .066mol$ $M = \frac{mol}{L}$

$\frac{.066mol}{4L} = .0167M$

14. A gas tank reads 500lbs/sq inch of pressure when inside a refrigerator. If that tank is removed from and placed outside in a warmer environment. What happens to the pressure?

Tank ↑ Pressure - Particles move faster.

15. Describe the environmental change on a molecular level.

More Collisions - Due to faster collisions

16. If the fridge was 3C and the room was 18C. What would be the new pressure in lbs/in^2?

276K → 291 $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\frac{500}{276} = \frac{x}{291}$

527 lb/in^2

$Al(OH)_3 + AgNO_3 \rightarrow Al(NO_3)_3 + AgOH$

Given 25 grams of silver nitrate dropped into 750 mL of .5M $Al(NO_3)_3$

a. Balance
b. Determine moles of each
c. What is the limiting reactant?
d. What is the ending volume? .750 mL
e. What is the concentration of $Al(NO_3)_3$? $.325mol / .750L = .43M$ .43M
f. The silver hydroxide precipitates out? What mass precipitates out? 18.5g

$25g\ AgNO_3 \cdot \frac{1mol}{169g} = .149mol$

$.5 = \frac{x}{.750}$ $x = .375mol$

$.149mol \cdot \frac{1}{3} = .0496mol$

	$1Al(OH)_3$	$3AgNO_3$	$Al(NO_3)_3$	$3AgOH$
I	.375	.149		
S	.0496	−.149	+.0496	+.149
E	.3254	0		

f) $.149mol \cdot \frac{124g}{1mol} = 18.5g$