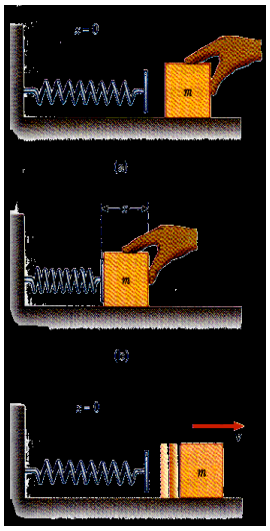


Gases - Ch. 14 - Honors Chemistry

I. First, a bit about energy…

A. There are two types of energy

1. The energy of an object due to its
2. The energy of an object due to its

II. Describing Gases

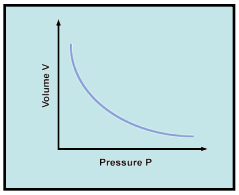
A. There are four properties of gases that help to describe them.

1. :
   a. The the gas exerts on its surroundings.
   b. Ex:
   c. Measured with a
   d. Atmospheric pressure: measured by a
   e. Some units of pressure
      i. Gives the in a manometer. a.k.a.
      ii.
      iii. This is the
   f. Converting units of pressure:
   g. Examples:

2. – measure of the
   a. Measured with a
   b. Units of temperature in chemistry
      i.
      ii.
      iii.
      -
   c. Conversion:
3.
   a. Only a
   b. Units of Volume:
      i.
      ii.
      iii. Also,
4.

III.

A. The theory helps to describe how gases behave.
B. The four assumptions of the KMT.
   1. Gas particles
   2. Gas particles
   3. Gas particles
   4. The of gas particles
C. These assumptions are (calculations)
D. Gases that follow this theory are known as
E. Gases aren't exactly ideal ( ) but we assume that they are.



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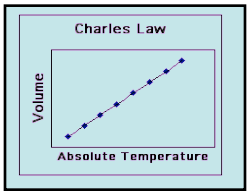
IV. Laws Describing Gases

A. Laws have been derived to predict how they behave.

B. Boyle's Law
1. States that (at)
2. Equation -->
3. Because, when you , the gas

C. Charles's Law
1. States that (at).
2. Equation =



3. Example = Balloon in Flask
4. Because, when you of a gas particle, it will be

D. Gay-Lussac's Law (the other law)
1. States that (at).
2. Equation =

3. Example = Soda can and tanker…
4. Because, when you , it will of a container

E. Combined Gas Law
1. Here is an equation that combines all the gas laws.
2. You can use this for all gas problems involving a
3. Equation =

4. If
5. When calculating,

V. Gas Stoichiometry

A. First,
1. When talking about gases, conditions change how the gas reacts.
2. That's why a standard was set.
3. (MEMORIZE!)
4. What is STP in K and kPa?
5. At STP,
   a. Examples:

B. Avogadro's Principle:

C.
1.
2.

D. Example: p. 441 #56
1: You will always need a balanced chemical equation

2: Convert to volume or moles where applicable.

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VI. Ideal Gas Law

A. An equation describes the behavior of an ideal gas.

B.The Ideal Gas Law incorporates Boyle's, Charles' and Avogadro's Laws into a single equation that incorporates numbers of moles of gas.

=
=
=
=
=

C. To solve ANY gas law problem, ask the following questions:

1. Which equation will be used?
2. Are all of the units correct?
3. Which variable is missing?

D. Examples:

1. Calculate the pressure, in kPa, of 1.65 g of helium gas at 16.0°C and occupying a volume of 3.25 L.

2. What volume of carbon dioxide forms when 525 mg of calcium carbonate completely reacts with hydrochloric acid? Assume that the carbon dioxide is formed at a pressure of 101 kPa and a temperature of 25°C.

E. Extension of the Ideal Gas Law

1. The ideal gas law can be rearranged to find other variables.
2. Two quantities that can be substituted:
   a. ; units: ; variables:
   b. ; units: ; variables:

VII. Two more laws

A. Dalton's Law of Partial Pressure:

1. The total pressure exerted by a mixture of gases is equal to the sum of the partial pressures of each gas in the mixture

2. Example: If the total pressure of gases above the water in the container has a pressure of 3.5 atm and the pressure of the water vapor is 1.5 atm, what is the pressure of the oxygen gas?

B. Graham's Law & Diffusion

1. Diffusion: movement of gas from a high concentration area to a low concentration area.
2. Rate of diffusion is inversely proportional to the molar mass of the gas particles.
3. The lighter particles move faster.
4. Graham's Law:

5. Example: The rate of diffusion of an unknown gas is 4 times faster than the rate of oxygen gas. Calculate the molar mass of the unknown gas and identify it.