Announcements

Monday, February 02, 2009

Lecture quiz 1 covering chapter 2 is now available **in D2L**. (Same place as the lab quizzes) It's due next Monday, Feb 9 before class.

MasteringChemistry:

- Lec 3 post (problems)
- Lec 4 pre (tutorials)
- Both due next Monday, Feb 9 before class.
- These will be available before 11 am Tuesday.

Elements to be memorized for exam 1 on webpage

Practice worksheets on webpage

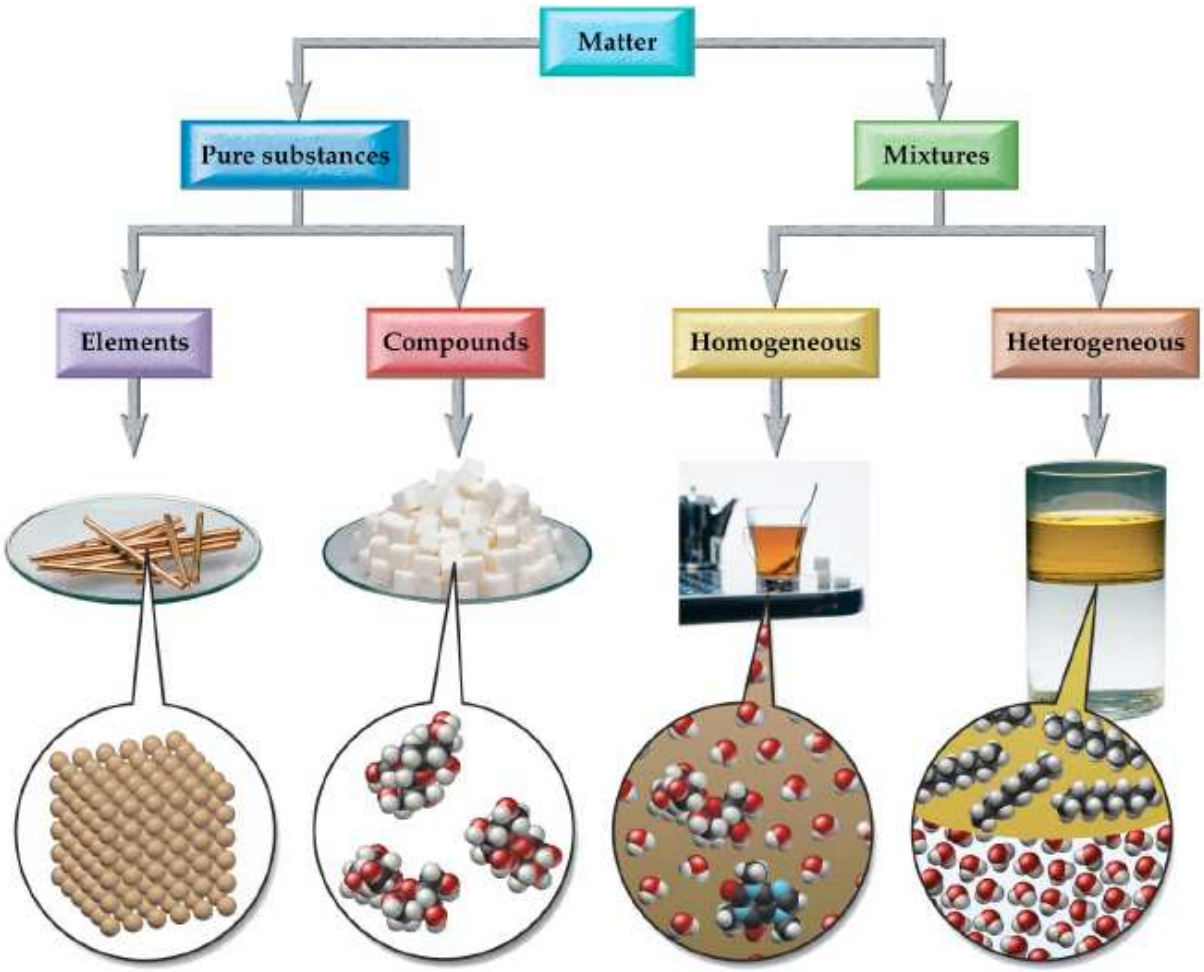
- Unit conversion
- Density

$1\ L = 1000\ mL$

$1\ mL = 1\ cm^3$

Lab 2 this week, lab 6 next week - prelab worksheet finished before lab.

Matter has both mass and volume



Pure substances:

- 1 type of matter
- fixed composition
- has formula, ex. H_2O

  (2:1 ratio H:O)

Mixtures:

- 2 or more types of matter
- variable composition

Elements have only one type of: atom

smallest piece of element

Compounds: pure substances with more than one different element

fixed ratio

Chemical formulas: show ratio of elements in a pure substance

NaCl: 1:1 ratio Na:Cl

H_2O: 2:1 H:O

Fe: element (iron)

Br_2: element

CO: carbon monoxide (compound)

Co: cobalt element

variable composition

Homogeneous mixtures: same consistency throughout

examples

lemonade (no pulp)

tap water

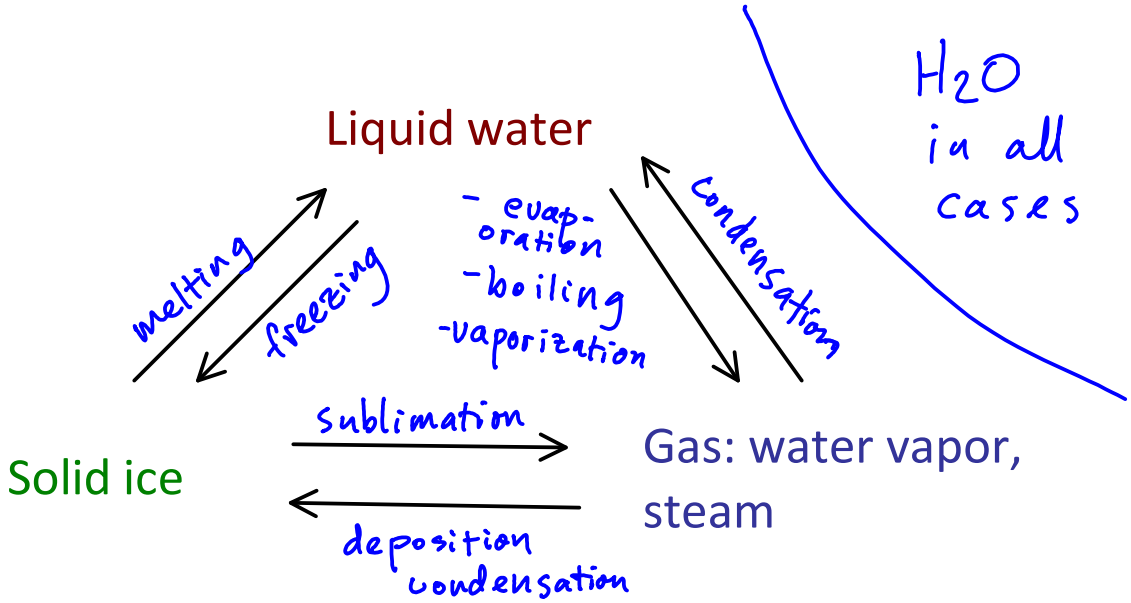
Heterogeneous mixtures: not same throughout

lemonade (w/ pulp)

gravel

Physical changes: change the form or appearance of substance, but still have… Same matter present
same elements or compounds

Phase changes are physical changes (between solid, liquid, and gas)



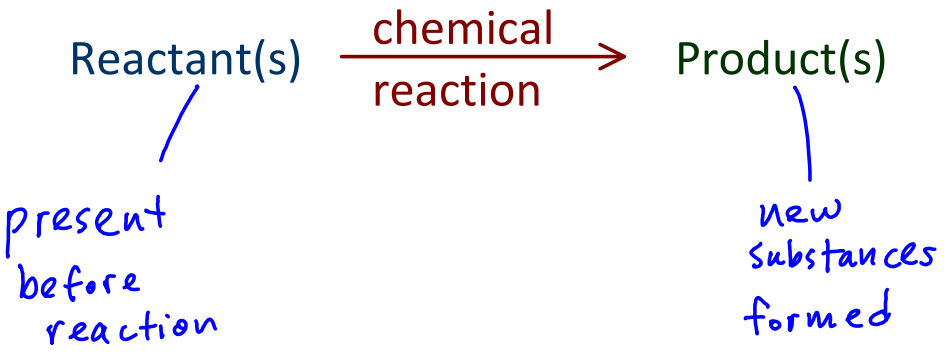
Dissolving, mixing, grinding are physical changes

Filtration, distillation, and other methods of separating mixtures into their pure substances are also physical changes.

Chemical change:
- A new type of matter is formed
- A new chemical formula is written
- Also known as a chemical reaction

Clues that a chemical change has occurred (all of these are evidence that a new substance has formed)
- Color change
- Odor, gas evolved (but not just from boiling)
- Flame, burning
- Temperature change on its own

Chemical equation represents a chemical reaction:



Physical properties describe the physical form of a substance. They can involve physical changes

- Boiling point, freezing point, melting point
- Color, odor, taste, consistency
- Density

Chemical properties describe behavior of a substance in chemical changes (usually in presence of other chemicals or heat)

- Sodium fizzes and ignites in water
- Magnesium does not react with water

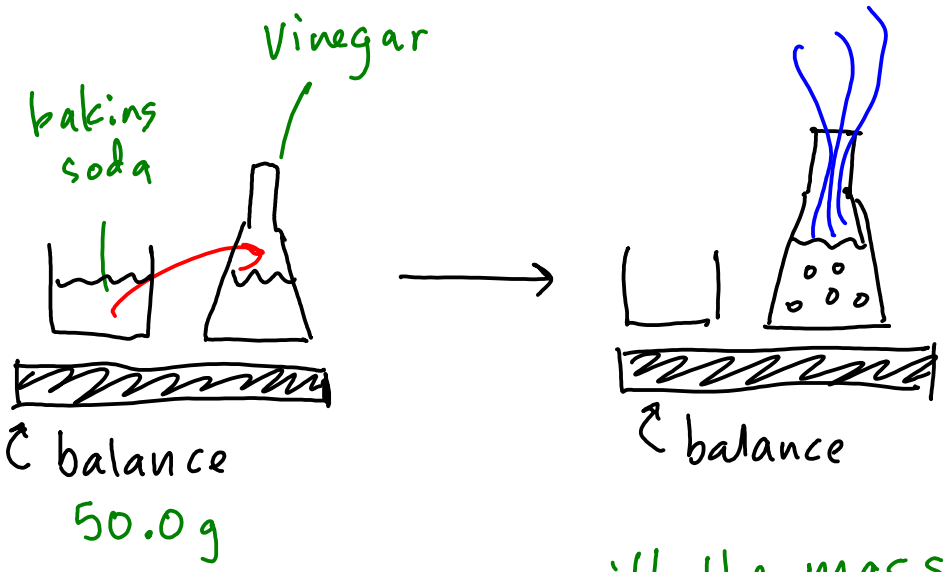
both are chemical properties

Identify the type of property:

- Baking soda will react with vinegar but not with water chem.
- Baking soda is a fine, white powder phys
- Hydrogen is explosive chem.

Baking soda dissolves in H_2O phys property

Law of conservation of mass: in a chemical reaction, matter can be neither... created nor destroyed



masses would be same if in a closed container

will the mass on the balance change? why or why not?

★ less than 50.0g because gas escaped

reactant masses = product masses

Temperature: • measure of atomic or molecular motion
• measured with... thermometer

K	**°C**	**°F**
Kelvin (SI unit)	degree Celsius	degree Fahrenheit
0 (absolute zero)	-273.15 °C	-459.67 °F
+273.15 ↓	+273.15 ↓	
273.15	0 °C (H_2O freezes)	32 °F
+100 ↓	+100 ↓	+180 ↓
373.15	100 °C (boiling pt of H_2O)	212 °F

$K = °C + 273.15$ or $°C = K - 273.15$

Mastering Chem & book uses 273

38.0 °C = ? K

$38.0 + 273.15 = 311.2$ K (1 dp)

$38.0 + 273 = 311$ K (0 dp)

Fahrenheit/Celsius conversions

1.8 & 32 are exact!

$°F = \frac{9}{5}\,°C + 32$ or $°C = \frac{5}{9}(°F - 32)$

$°F = 1.8(°C) + 32$ $\quad °C = \frac{(°F - 32)}{1.8}$

82 °F = ? °C

$°C = \frac{(82 - 32)}{1.8}$

$= 28\,°C$ (2 s.f.)

°F ⟷ °C use sig figs from orig temp.

82 °F = ? K

°F → °C → K

$°C = \frac{82 - 32}{1.8} = 27.777\ldots + 273.15$

$= 300.9277 = 301$ K

Omit last 2 assigned problems from Ch 3 in syllabus