Converting grams to moles

Steps to convert mass to moles using dimensional analysis.

1. Write the formula for the element, compound or molecule
   (what's the difference between an element, a compound and a molecule?)
2. Write the conversion factor.
3. Solve using dimensional analysis

- Element – on the periodic table
- Compound - made of more than one element. Bonds are ionic (metal/ non-metal)
- Molecule – made of more than one element. Bonds are covalent (non-metal/non-metal)

Let's try one

Convert 39.2 grams of Gold to moles.

1. Write the formula for the element, compound or molecule

   The formula for Gold is **Au**
2. Write the conversion factor

   From the Periodic Table the conversion factor is:

$$\frac{197 \text{ g Au}}{1 \text{ mol Au}}$$

3. Solve using dimensional analysis

$$39.2 \text{ g Au} \times \frac{1 \text{ mol Au}}{197 \text{ g Au}} = .199 \text{ mol Au}$$

39.2 x 1÷197= .199

Remember!

- Every mole has 6.02 X 10^{23} units
  - 1 mole of an element has 6.02 X 10^{23} atoms
  - 1 mole of a molecule has 6.02 X 10^{23} molecules
- 1 mole of any gas, occupies 22.4 liters in volume at standard temperatrue and pressure (STP)

Conversion Problems

Convert to moles – one problem for each person at a table.

- 35.6 grams of $Cu(OH)_2$
- 74.6 liters of H_2
- 4.71 x 10^{24} molecules of water
- 58.3 grams of $AgNO_3$

#1 Convert to moles

$$35.6\ g\ Cu(OH)_2 \times \frac{1\ mole}{97.55\ g}$$

0.365 moles $Cu(OH)_2$

2: Convert to moles

$$74.6 \text{ liters of } H_2 \times \frac{1 \text{ mole}}{22.4 \text{ liters}}$$

3.33 moles H_2

#3: Convert to moles

$$4.71 \times 10^{24} \text{ molecules } H_2O \times \frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ molecules}}$$

7.82 moles H_2O

#4: Convert to moles

$$58.3 \text{ g } AgNO_3 \times \frac{1 \text{ mole}}{169.87 \text{ g}}$$

0.343 moles $AgNO_3$