Molarity

Molar concentration

AKA Molarity

1.5M = 1.5mole solute / 1L

AKA Moles of solute per total liters of solution

M = moles of solute / 1L soln

6M = 6mol / 1L

A soln of 1 mol/L is also read as a "1 molar" soln.

1M = 1molar

1mL = 1cm^3

1 M 1 mol/L 1 mol/dm^3

QT CONC

1L = 1dm^3

It is important to distinguish moles from molarity.

Molarity is a measurement of concentration of a soln.

Moles are a measure of the amount of substance present at a given time.

Stoichiometry and Molarity

CV = n

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$\left(\frac{mol}{L}\right)(L) = n$

Where C = concentration in mol/L

V = volume in L

n = moles

e.g. What is the molarity when 2.5 g of NaCl dissolved to make 35.0 mL of soln?

$$\frac{2.5\,g\,NaCl}{35.0\,mL} \times \frac{1000\,mL}{1\,L} \times \frac{1\,mol}{58.5\,g} = 1.2\ \frac{mol\ solute}{L\ soln}$$

e.g. How many mL of a 3.0 mol/L KOH soln will contain 0.28 g of solute?

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$$0.28\,g\,KOH \times \frac{1\,mol\,KOH}{56\,g\,KOH} \times \frac{1\,L}{3.0\,mol} \times \frac{1000\,mL}{1\,L} =$$

1.7 mL

$$\frac{3.0\,mol}{1\,L}\ \text{or}\ \frac{1\,L}{3.0\,mol}$$

And now for the stoichiometry!

Instead of starting with g of A or particles of A you may have a volume of a concentration of a solution of A.

Zn(s) + 2 HCl(aq) → ______________________________

If 40.0 mL of a 6.0 mol/L hydrochloric acid solution reacts with sufficient zinc, how many grams of hydrogen will form?

To completely react 10.00 g of Zn, how many mL of a 1.5 M HCl solution will be required?

Remember—all conversion factors can be inversed.

And, of course, we can turn the problem into a limiting reagent one:

If 500. mL of a 1.25 mol/L HCl solution reacts with 5.00 g of Zn:

i) What mass of hydrogen will form?

ii) What is the limiting reagent?

iii) What amount of the excess reagent is left over?