

(14.4)

concentration of solutions

concentration of a solution - a quantitative expression of the amount of dissolved solute in a certain quantity of solvent

qualitative

dilute sol'n -
↓ amt. dissolved
solute

concentrated sol'n -
↑ amt. dissolved
solute

① mass percent (e.g., 10% NaOH)

$$\text{mass \%} = \frac{\text{g solute}}{\text{g solute} + \text{g solvent}} \times 100$$

② volume percent (e.g., 70% by volume, isopropyl alcohol)

$$\text{vol \%} = \frac{\text{vol of liquid in question}}{\text{total volume of sol'n}} \times 100$$

③ molarity (e.g., 2.0 M HCl)

$$\text{molarity} = \frac{\text{moles of solute}}{\text{liters of solution}}$$

molarity (moles/L) is abbreviated by a capital M

When a sol'n is diluted by adding solvent, there is a simple relationship btwn the starting concentration and the concentration after dilution.

$$M_1 V_1 = M_2 V_2$$

where

M = concentration (in M)

V = volume (usually in L or mL, volume units must be the same)

this equation applies only when a sol'n is diluted with a pure solvent (e.g., H₂O)