

New Concentration units

Notes 10/30

→ Molality (m)

$$m = \frac{\text{mol solute}^{\text{less mass}}}{\text{kg solvent}^{\text{more mass}}}$$

ex) mix 92.5g Ag, 7.5g Cu, "sterling" silver alloy

Find molality:

Solute: Cu

Solvent: Ag

$$7.5 \text{g Cu} \left(\frac{1 \text{ mol Cu}}{63.55 \text{g}} \right) = \underline{0.12 \text{ mol Cu}}$$

Molality: $\frac{\text{mol Cu}}{\text{kg solvent}}$

→ 0.0925 kg Ag

$$m = \frac{0.12 \text{ mol Cu}}{0.0925 \text{ kg Ag}} = 1.3 \text{ m Cu}$$

↓
"molal"

→ 2) Mole Fraction: $\frac{\text{mol of one substance}}{\text{total moles}}$

- Find mole fraction of Cu in above problem

$$MF_{\text{Cu}} = \frac{\text{mol Cu}}{\text{mol Cu} + \text{mol Ag}} = \frac{0.12 \text{ mol Cu}}{0.12 \text{ mol Cu} + 0.856 \text{ mol Ag}} = \boxed{0.12}$$

$$92.5 \text{ mol Ag} \left(\frac{1 \text{ mol Ag}}{107.87 \text{g}} \right) = 0.856 \text{ mol Ag}$$

$$\boxed{MF_{\text{Cu}} = 0.12}$$