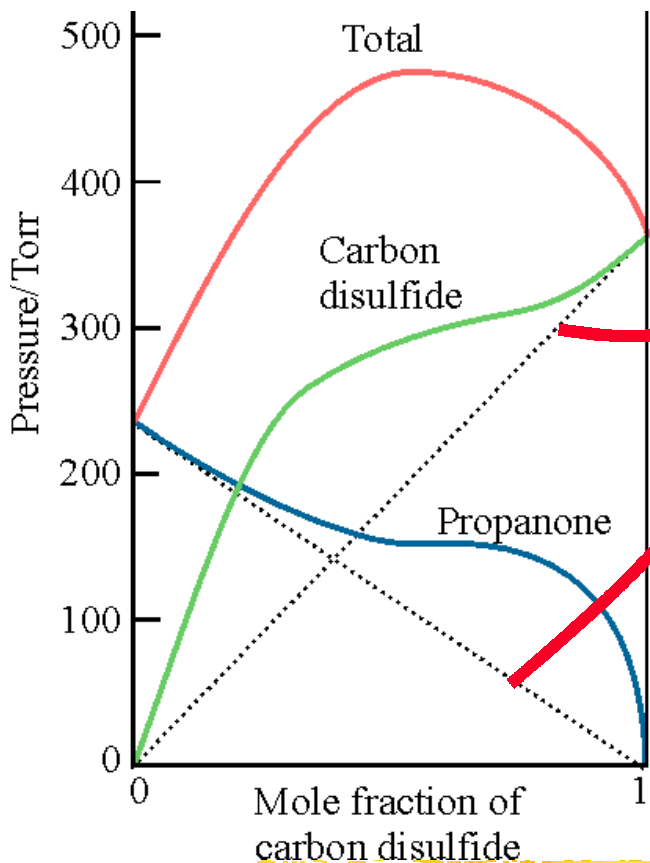


Non-ideal solutions

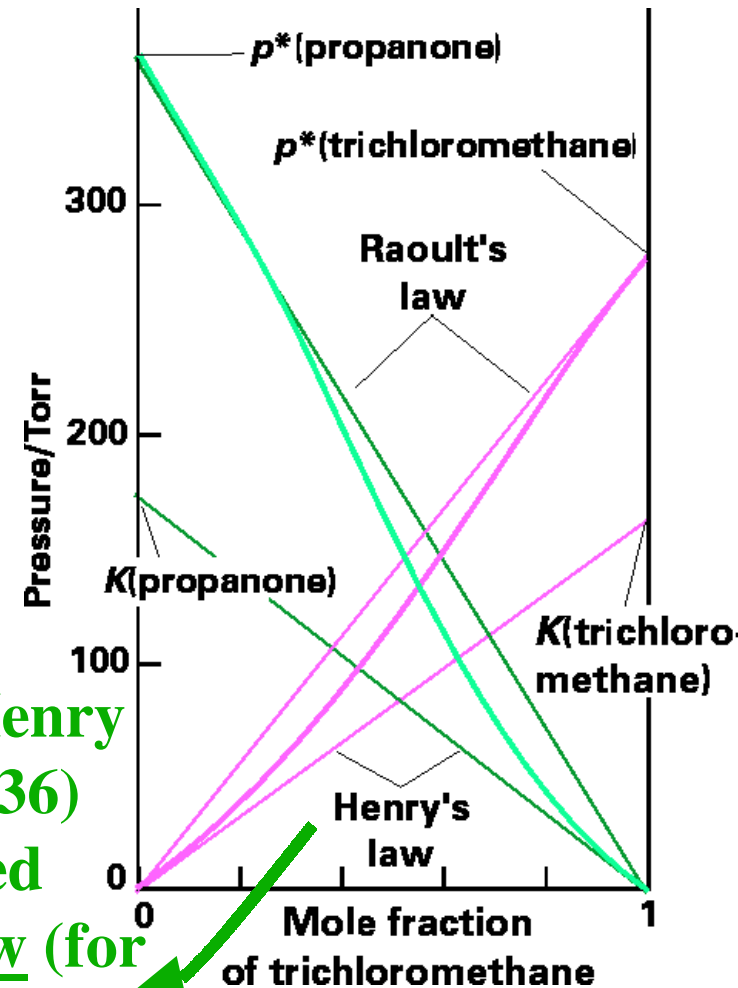
Strong deviations from ideality are shown by dissimilar substances



Raoult's law obeyed for a close-to-pure solvent

William Henry (1775-1836) observed Henry's law (for a dilute solute):

$$p_B = x_B K_B \text{ (e.g., gas solubility)}$$



Ideal and real solutions: Activities

From both Raoult's (solvent) and Henry's laws (solute) follows:

$$\begin{aligned}\mu_{solv}(l) &= \mu_{solv}^{\ominus}(l) + RT \ln x_{solv} \\ &= \mu_{solv}^{\ominus}(l) + RT \ln C[solv]\end{aligned}$$

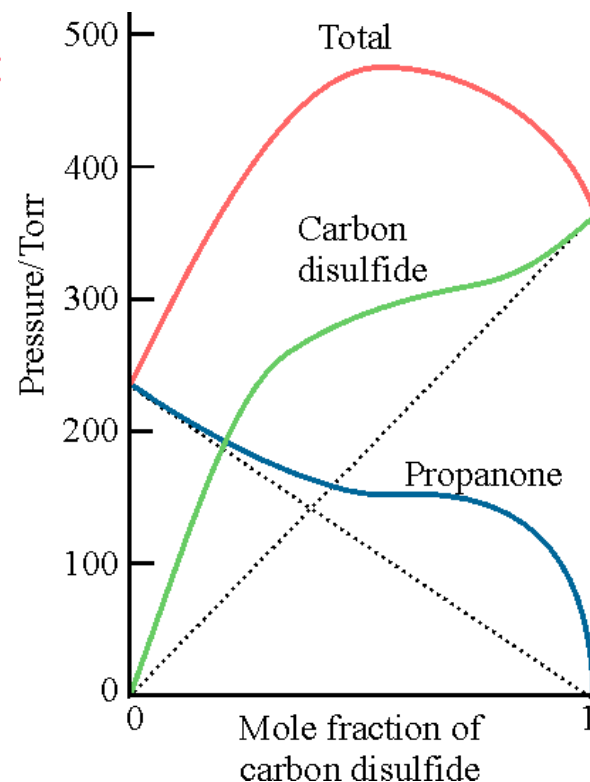
$$\Rightarrow \mu_J = \mu_J^{\ominus} + RT \ln[J]$$

standard chemical potential @ 1 M

The chemical potential is a measure of the ability of J to bring about physical or chemical change

BUT:

↓
to preserve equation for real solutions:



$$\mu_J = \mu_J^{\ominus} + RT \ln a_J$$

Effective concentration
= activity $a_J = \gamma_J[J]$