

# ACTIVITY & EQUILIBRIA

CHEM 25 | SDSU

# ACTIVITY COEFFICIENTS

- The activity coefficient represents the deviation from ideal behavior
- The activity coefficient changes with increasing ionic strength

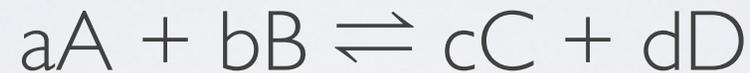
$$A_c = [C] \gamma_c$$

$A_c$ : Activity of C  
 $[C]$ : Concentration of C  
 $\gamma_c$ : Activity coefficient of C

The activity of a compound is the corrected concentration of that species - accounts for deviations from ideal behavior

# ACTIVITY - EQUILIBRIUM

We can replace the concentration in any equation by the activity



$$K = \frac{[C]^c \times [D]^d}{[A]^a \times [B]^b} \longrightarrow K = \frac{A_C^c \times A_D^d}{A_A^a \times A_B^b}$$

$$K = \frac{[C]^c \gamma_C^c \times [D]^d \gamma_D^d}{[A]^a \gamma_A^a \times [B]^b \gamma_B^b}$$

# SAMPLE SOLUBILITY PROBLEM

What is the maximum concentration of hydroxide that would be soluble in a solution containing  $4.5 \mu\text{M}$  manganese chloride?

What if there was  $12 \text{ mM}$  sodium nitrate (an inert salt) in the solution?

# SAMPLE PH PROBLEM

What is the pH of a solution comprised of 2.8 mM sulfuric acid, and 18 mM potassium sulfate?

What is the pH of the same solution if we account for the activity of the ions in solution?