

Seymour

# Thermodynamics - 4 - Free Energy ( $\Delta G$ )

$$\Delta G = \Delta H - T \Delta S$$

$\Delta G$  predicts spontaneity.

$$\Delta G < 0 \quad \text{spont.} \quad (-\Delta G)$$

$$\Delta G > 0 \quad \text{non spont.} \quad (+\Delta G)$$

$$\Delta G = 0 \quad \text{eq.}$$

In general - if  $\Delta H$  is -ve &  $\Delta S$  is +ve.  
(exo) (higher entropy)

$\Delta G$  will be spont. (- $\Delta G$ )

$$\Delta G = \underbrace{\Delta H}_{-ve} - \underbrace{T \Delta S}_{+ve}$$

Temp. plays a big role.

Similarly if  $\Delta H$  +ve with  $\Delta S$  is -ve.  
(endo) (lower entropy)

$$\Delta G = \underbrace{\Delta H}_{+ve} - \underbrace{T \Delta S}_{-ve} \quad \Delta G = \underline{+ve} \quad \text{non spont.}$$

$$\underline{\Delta G^\circ} = \sum \Delta G^\circ_{\text{react. (prod.)}} - \sum \Delta G^\circ_{\text{product (react.)}}$$