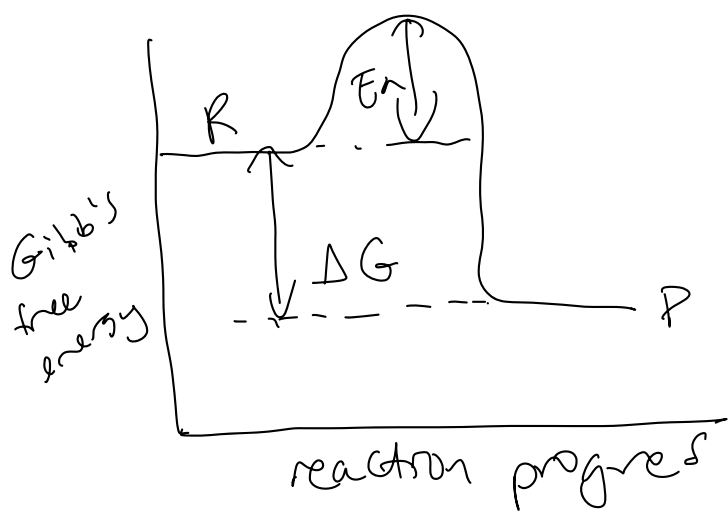


7/26 recap: Thermodynamics



$\Delta G < 0$
spont.

irreversible rxn.

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

if temp other than
25.0°C ΔG°
non-standard

"Standard"

ΔG° is normal
lab conditions

25.0°C
1 M for aq.
solutions
1 atm for
gases

For a $\rightleftharpoons$ reversible reaction

② eg. $\Delta G = 0$

$\Delta G^\circ = -RT \ln K$
* when the reversible
reaction has
established eq.

→ (a) any other moment before eq. is established

$$\Delta G = \Delta G^\circ + RT \ln Q$$

25.0°C

initial
Q of
reactants
and
products
to determine
"Q"

Thermodynamics

1) Determine ΔG° for an irreversible reaction using method A:

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

method B:

$$\Delta G^\circ = \sum n \Delta G_f^\circ \text{ products} - \sum n \Delta G_f^\circ \text{ reactants}$$

(2) For eq. (reversible rxn's) determine ΔG° @ eq.
If given K or calculate K if given

$$\Delta G^\circ < 0 \quad \text{Spont.}$$

$$\Delta G^\circ > 0 \quad \text{non-spont.}$$

= If a reaction is non-spont at what temp. would the reaction become spont.

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

↳

$$0 = \Delta H - T\Delta S^\circ$$

solve for temp.