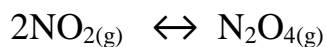


Ap Chem Unit 11 – Thermodynamics

Wkst: Gibbs Free energy

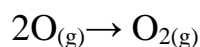
1. What is Gibb's free energy? What is its symbol?
2. What is the equation for Gibbs Free Energy (ΔG)?
3. Why is it such a useful state function?
4. What sign must ΔG have to indicate a thermodynamically favorable process?
5. At what temperatures would the following processes be thermodynamically favorable? (Show why using Gibbs free energy equation)
 - $+\Delta S, -\Delta H$
 - $-\Delta S, -\Delta H$
 - $+\Delta S, +\Delta H$
 - $-\Delta S, +\Delta H$

6. For the following constant pressure process



- ΔH° is -58.03 kJ and ΔS° is -176.6J/K. What is the value of ΔG° at 298K?
- At what temperature is $\Delta G^\circ = 0$ (assume ΔH° and ΔS° are not temp. dependent).
- Would ΔG° be negative above or below that temp?

7. For the following constant pressure process



- Sign of ΔH ? Why?
- Sign of ΔS ? Why?
- Would this process be thermodynamically favorable at low or high temperatures?

8. ΔG° gives us important information about the _____ position of a reaction.

9. The value of ΔG depends on the _____ and _____ of reactants and products. Therefore the value of ΔG _____ as a reaction proceeds.

10. At equilibrium the value for ΔG is _____.

11. Provide an equation for the following relationships:

- Relates ΔG° to K

- When would you use this equation?

12. What is the equation used to solve for the free energy of reaction using the free energy of formation?

13. What is entropy?

14. Why do things tend toward disorder?

- A.

- B.

15. What state of matter has the highest entropy?

16. Determine the sign of ΔS and explain why:

