

Reaction Kinetics

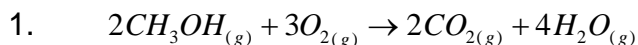
Problem Sheet #1

Name _____

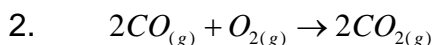
Date _____

Period _____

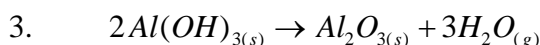
Determine whether the following reactions are spontaneous or non-spontaneous.
SHOW YOUR WORK ON ANOTHER SHEET.



Use the equation $\Delta G^0 = \Delta H^0 - T\Delta S^0$. Assume standard conditions.

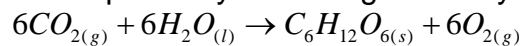


Use the equation $\Delta G^0 = \Delta H^0 - T\Delta S^0$. Assume standard conditions.



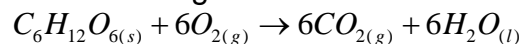
Use the equation $\Delta G^0 = \Delta H^0 - T\Delta S^0$. Assume standard conditions.

4. Green plants synthesize glucose by photosynthesis as shown in the following reaction.

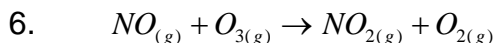


Find ΔG^0 from ΔH^0 and ΔS^0 at $25^\circ C$.

5. Animals use glucose as a source of energy as shown in the following reaction.



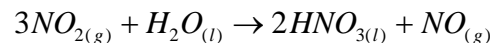
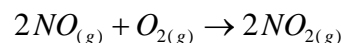
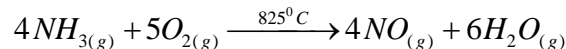
Find ΔG^0 from ΔH^0 and ΔS^0 at $25^\circ C$.



Find ΔG^0 from ΔH^0 and ΔS^0 at $25^\circ C$.

This reaction represents one of the ways that ozone (O_3) is destroyed in the upper atmosphere.

7. The Ostwald process for the commercial production of nitric acid involves three steps:

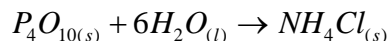


(A) Calculate ΔH^0 , ΔS^0 , and ΔG^0 (all at 298K) for each of the three steps.

(B) Tell whether each step is spontaneous or non-spontaneous.

(C) Explain why the first step occurs at $825^\circ C$ and not $25^\circ C$.

8. Calculate ΔG^0 using ΔG^0_f for the reactants and products.



Tell if these reactions are possible at $25^\circ C$.