

AP Chemistry Daily Videos

9.4 Thermodynamic and Kinetic Control

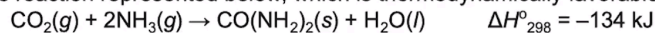
Video #1

1. Reactions that are thermodynamically favorable BUT have slow rates are under _____ control. Generally, these reactions have _____ activation energy.

2. Stop the video @ 3:32 and try the problem on your own. Then evaluate your work and identify any errors you may have made.

Answer the following questions in terms of thermodynamic principles and concepts of kinetic molecular theory.

- (a) Consider the reaction represented below, which is thermodynamically favorable at 298 K.



- For the reaction, indicate whether the standard entropy change, ΔS°_{298} , is positive, negative, or zero. Justify your answer.
 - Which factor—the change in enthalpy, ΔH°_{298} , or the change in entropy, ΔS°_{298} —provides the principal driving force for the reaction at 298 K? Explain.
 - For the reaction, how is the value of the standard free energy change, ΔG° , affected by an increase in temperature? Explain.
- (b) Some reactions that are predicted (based on the sign of their ΔG°) to be thermodynamically favorable at room temperature do not proceed at a measurable rate at room temperature.
- Account for this apparent contradiction.
 - A suitable catalyst increases the rate of such a reaction. What effect does the catalyst have on the ΔG° of the reaction? Explain.

