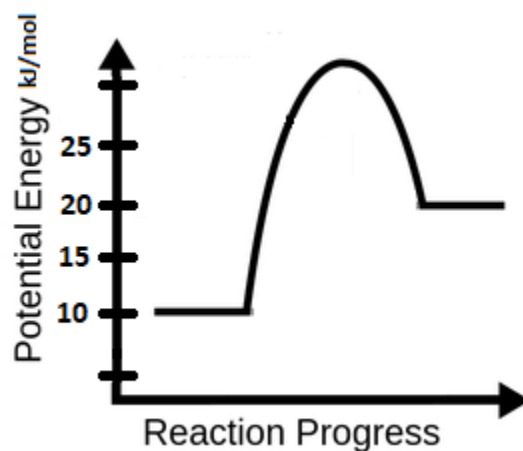
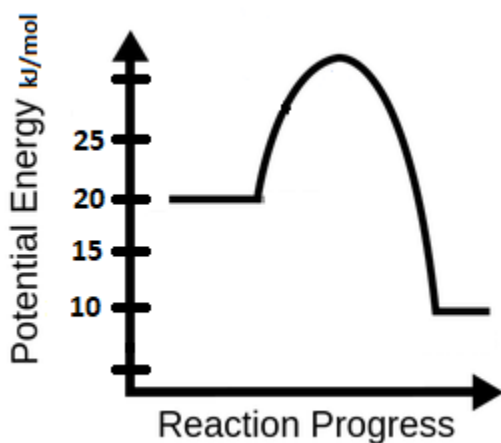


AP Chemistry Daily Videos

5.6 Reaction Energy Profile

Video #1

1. Describe what information you can gather in a reaction energy profile. Include a sketch of an example, making sure you label key components.
2. What three things must occur in order for a reaction to occur?
 - a.
 - b.
 - c.
3. Put in your own words what activation energy means. Energy needed to do what?
4. Identify the following reactions as exothermic or endothermic. Explain your rationale. In addition, label the activation energy and the ΔH° . Calculate the change in energy.

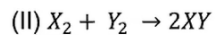
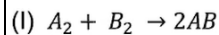


5. What is the activated complex/transition state?
6. If the activation energy increases, and the reactants must collide with even more force, then how does that increase affect the reaction rate?

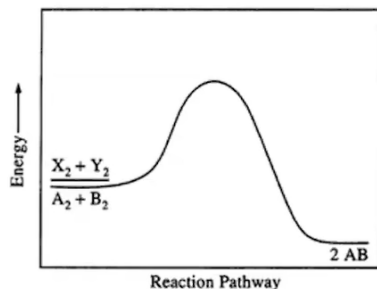
7. In a different color, label the activation energy of a reverse reaction in the diagrams in #4.

Video #2

1. Pause the video at 1:30 and attempt the problem, then evaluate how you did and identify any errors.



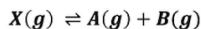
Two reactions are represented above. The potential-energy diagram for reaction I is shown below. The potential energy of the reactants in reaction II is also indicated on the diagram. Reaction II is endothermic, and the activation energy of reaction I is greater than that of reaction II.



(a) Complete the potential-energy diagram for reaction II on the graph provided.

(d) From the information given, determine which reaction initially proceeds at the faster rate under the same conditions of concentration, temperature and reaction mechanism. Justify your answer.

2. Pause the video at 5:30 and attempt the problem, then evaluate how you did and identify any errors.

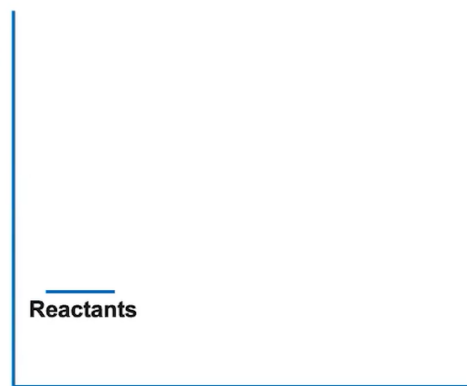


ΔH° for the above reaction = +63 kJ

The forward reaction is slow at room temperature but becomes rapid when a catalyst is added.

a) On the diagram of potential energy vs reaction coordinate for the uncatalyzed reaction. On this diagram label:

- i. both axes
- ii. product energy
- iii. activated complex energy
- iv. sketch the curve
- v. activation energy
- vi. enthalpy



Source: Released AP exam 1980 (Modified)

Source: Dena K. Leggett

Video #3

1. Complete the table below:

Factor that affect reaction rate	Why does it affect the rate?	Impact on rate constant

2. The factors listed above are represented by what variable in the rate law? Use the PhET Simulation [Reactions & Rates](#) and discuss what you learned.
3. Draw and label the Maxwell-Boltzmann Distribution to show how the number of molecules at or above the activation energy changes with respect to temperature. Shade the area under the curve that represents the number of molecules with enough activation energy and the coldest temperature compared to the hottest temperature. Describe in words what happens as the temperature increases. Does the activation energy change?
4. Redraw the Maxwell-Boltzmann graph when a catalyst is used. How does the area under the curve change? Did the activation energy change when the catalyst was used?