

Session 1/ CH 117
14 Jan. 2014

1. Explain the difference between thermodynamics and kinetics.

tells us about the stability of the products vs. reactants.
related to ΔG , tells us what equilibrium will look like, but not how fast we will get there

concerned with rate of reaction or speed
gives us information regarding reactivity.

2. Name 4 properties that affect the rate of reaction of homogenous mixtures.

- Properties of reactants ; products
- Concentration
- temperature - how
- Catalyst - how

3. Calculate the Av. Speed of the following reaction $A+B \rightarrow AB$ from 0 to 2 seconds and 2 to 4 seconds.

Change in Concentration of A

Time (s)	Concentration (M/s)
0	10
2	8
4	4

$$\frac{10-8}{0-2} = -\frac{2}{2} = -1$$

$$\frac{8-4}{2-4} = \frac{4}{-2} = -2$$

*4. True or False: Would using the concentration change of AB per second result in the same reaction rate.

Yes, but the answer would be positive

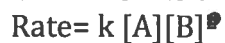
*5. Write the rate formula for each species in the following reaction (write it in the way that the rate of the reaction does not depend on which species we measured):



$$rate = \frac{\Delta[Fe]}{8 \Delta t} = \frac{\Delta[S_8]}{\Delta t} = \frac{\Delta[FeS_8]}{\Delta t}$$

$$\frac{\text{Conc}}{\text{time}} / \text{conc} = \frac{1}{t}$$

*6. What is the Units of K for the following reaction? What's the order?



$$\text{conc.}^2 t$$

$$K \text{ units is } \frac{1}{\text{conc. time}}$$

Order is 2

7. Use the Data from the table to determine the rate law expression.



Experiment	[A]	[B]	Initial Rate (M/s)
1	.2	.1	2×10^{-2}
2	.2	.2	4×10^{-2}
3	.3	.5	3×10^{-2}
4	.4	.1	2×10^{-2}

$$\text{Rate} = k [B]$$

b. Using experiment 1, find k.

$$2 \times 10^{-2} = k [0.1]$$

$$k = 0.2$$

c. True or False. If $1/[B]$ is graphed as a function of time (t on x-axis), the graph would be linear.

False, the reaction is first order. you need to ln it.

d. Find concentration of B at t=2 if initial concentration of B is 2.

$$\begin{aligned} \ln [B]_t &= -kt + \ln [B_0] \\ (-0.2)(2) + \ln(2) \\ &= -0.4 + 0.6931 \end{aligned}$$

$$\ln [B]_t = 0.293$$

$$e^{} [B]_t = 1.341$$