Monday, February 9, 2015

*Learning objective: 4.2 The student is able to analyze concentration vs. time data to determine the rate law for a zeroth-, first-, or second-order reaction*

**As you enter...**

What is the purpose of the lab you are about to conduct?
What are the first few steps that you will need to do to set up the lab?

*You will be required to do a formal lab write up for this lab, to be emailed by midnight next Monday.
**Homework: Textbook HW due Wednesday**

***Big Idea 5: The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.***

1st/2nd period:

- Review Pre-Lab (10 min)
- Conduct Lab 11 (70 min)
- Exit Tix (10 min)

Tix out the door

Write your name on the paper.

**AP Exam Question 2011**

zero 2nd 1st

Conc. vs time

$= k$ zero

Find slope

Tuesday, February 10, 2015


*Learning objective 4.7 The student is able to evaluate alternative explanations, as expressed by reaction mechanisms, to determine which are consistent with data regarding the overall rate of a reaction, and data that can be used to infer the presence of a reaction intermediate.*

**As you enter...**

What should be included in the discussion section (analysis) of your lab write up for yesterday's lab?

- significance of data, explaining it
- not restating procedure
- connect to goal of lab

**Homework: Textbook HW tonight, Quiz Thursday**

***Big Idea 5: The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.***


1st period:

- Review Lab (5 min)
- Reaction Mechanism Notes and Video (30 min)
- Exit Tix (10 min)

http://www.bozemanscience.com/ap-chem-041-multistep-reactions

Tix out the door

Write your name on the paper.

**What can go down a chimney up, but not up a chimney down?**

Wednesday, February 11, 2015


*Learning objective 4.7 The student is able to evaluate alternative explanations, as expressed by reaction mechanisms, to determine which are consistent with data regarding the overall rate of a reaction, and data that can be used to infer the presence of a reaction intermediate.*

**As you enter...**

How does the collision model help us understand rates of reactions?

* amount of energy
* orientation

**Homework: Quiz tomorrow**

***Big Idea 6: Rates of chemical reactions are determined by the details of the molecular collisions.***


1st period:

- Homework Questions? (15 min)
- Going to location with more computers (5 min)

1st/2nd period

- PhET Simulation: Reactions and Rates (60 min)
- Exit Tix (10 min)

Tix out the door

Write your name on the paper.

**Explain how three different factors can affect the rates of a reaction.**

**Draw a labeled potential energy diagram to support your answer.**

(64) $\ln\left(\frac{k_2}{k_1}\right) = \frac{E_a}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$

first order $\frac{1}{s}$

$k_1 = 4.6 \times 10^{-2}\ s^{-1}$, $T_1 = 0 = 273\ K$

$k_2 = 8.1 \times 10^{-2}\ s^{-1}$, $T_2 = 20 = 293\ K$

$R = 8.31\ J/K \cdot mol$

$\rightarrow E_a = 1.90 \times 10^4\ J/mol$

(69)

c) $E_a(un) = 14.0\ kJ$

$E_a(cat) = 11.9\ kJ$

$\frac{k_{cat}}{k_{un}} = ?$ $T = 25\ ^\circ C$

$A$ = constant

$$\frac{\ln(k_c) = \frac{E_{a(c)}}{RT_c} + \ln(A)}{\ln(k_{un}) = \frac{E_{a(un)}}{RT} + \ln(A)}$$

$$\ln\left(\frac{k_c}{k_{un}}\right) = \frac{E_{a(c)}}{E_{a(un)}}$$

$$e^{\ln\left(\frac{k_c}{k_{un}}\right)} = e^{\frac{E_{a(c)}}{E_{a(un)}}}$$

$$= e^{11.9/14} = \boxed{2.3}$$

Thursday, February 12, 2015


*Learning objective 4.7 The student is able to evaluate alternative explanations, as expressed by reaction mechanisms, to determine which are consistent with data regarding the overall rate of a reaction, and data that can be used to infer the presence of a reaction intermediate.*

**As you enter...**
How does the collision model help us understand rates of reactions?

**Homework: Pre-Lab #12**

***Big Idea 6: Rates of chemical reactions are determined by the details of the molecular collisions.***


1st period:

- Kinetics Quiz (20 min)
- Review Quiz (20 min)

Tix out the door

Write your name on the paper.

**E**

① initially T = 0

$M = \frac{mol}{L}$ $158 = \frac{1}{[X]}$ L/mol

.0063 mol/L (5.00L) = .0317 mol

②

20 min (.00427 mol/L) 5 L

= $2.14 \times 10^{-2}$ mol X remains

1 pt

$3.17 \times 10^{-2}$ initial $- 2.14 \times 10^{-2} = 1.03 \times 10^{-2}$ mol X reacted

$\frac{2 \text{ mol Y}}{1 \text{ mol X}} = \frac{Y}{1.03 \times 10^{-2} \text{ mol}}$

1 pt

$Y = 2.06 \times 10^{-2}$ mol Y

$\times 6.022 \times 10^{23}$ molecules/mol

$= 1.24 \times 10^{22}$ molecules (1 pt)

③ 1st (1 pt)

④ Rate = k [X] (1 pt)

⑤ k = ?

slope = .0197 (1 pt) $min^{-1}$ (1 pt)

$\frac{\ln [X]_t}{\ln [X]_0} = -kt$

k: $min^{-1}$, t: min

⑥ $[X]_{iso} = ?$

$= 3.30 \times 10^{-4}$ M