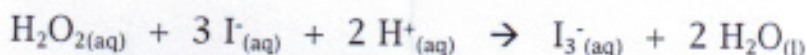


CHM 152
Quiz 1

Spring 2009
Dr. Doug Sawyer

Name Key
5 digit ID _____

The rate law for the following reaction can be determined by the method of initial rates. (a) Use the data to determine the rate law. (b) Use the data from Experiment #1 to determine the value of k. Be sure to include the correct units for k. Show your work.



Experiment	Initial [H ₂ O ₂]	Initial [I ⁻]	Initial [H ⁺]	Initial rate (M/sec)
#1	0.010 M	0.010 M	0.00050 M	1.15 × 10 ⁻⁶
#2	0.020 M	0.010 M	0.00050 M	2.30 × 10 ⁻⁶
#3	0.010 M	0.020 M	0.00050 M	2.30 × 10 ⁻⁶
#4	0.010 M	0.010 M	0.00100 M	1.15 × 10 ⁻⁶

(a)

double [H₂O₂], keep others constant → rate doubles

double [I⁻], keep others constant → rate doubles

double [H⁺], keep others constant → rate doesn't change

$$\text{rate} = k [\text{H}_2\text{O}_2]^1 [\text{I}^-]^1 [\text{H}^+]^0 = k [\text{H}_2\text{O}_2] [\text{I}^-]$$

BONUS (2 pts): Name the compound: CuNO₂

→
Copper(I) nitrite

(b)

$$\text{rate} = k [\text{H}_2\text{O}_2] [\text{I}^-]$$

$$\frac{\text{rate}}{[\text{H}_2\text{O}_2][\text{I}^-]} = k$$

$$\frac{1.15 \times 10^{-6} \text{ M/sec}}{(.010 \text{ M})(.010 \text{ M})} = k$$

Experiment	Initial [H ₂ O ₂]	Initial [I ⁻]	Initial [H ₂ O]
1	0.010 M	0.010 M	0.0050 M
2	0.020 M	0.010 M	0.0050 M
3	0.010 M	0.020 M	0.0050 M
4	0.010 M	0.010 M	0.0100 M

$$1.15 \times 10^{-2} \text{ M}^{-1} \text{ sec}^{-1} = k$$