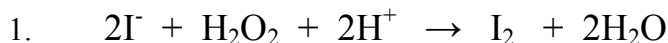


Kinetics lab sheet.

Equations:



$$\text{rate} = \frac{-\Delta[\text{I}^-]}{2\Delta t} = \frac{-\Delta[\text{H}_2\text{O}_2]}{\Delta t} = \frac{+\Delta[\text{I}_2]}{\Delta t} = k[\text{I}^-]^x [\text{H}_2\text{O}_2]^y [\text{H}^+]^z$$

With the use a buffer, the $[\text{H}^+]$ is constant. The equation then becomes:

$$\text{rate} = \frac{-\Delta[\text{I}^-]}{2\Delta t} = \frac{-\Delta[\text{H}_2\text{O}_2]}{\Delta t} = \frac{+\Delta[\text{I}_2]}{\Delta t} = k'[\text{I}^-]^x [\text{H}_2\text{O}_2]^y \quad \text{where } k' = k[\text{H}^+]^z$$

Take the ln of each side : $\text{rate} = k'[\text{I}^-]^x [\text{H}_2\text{O}_2]^y$

$\ln \text{rate} = \ln k' + x \ln [\text{I}^-] + y \ln [\text{H}_2\text{O}_2]$ now rearrange into the form of $y = mx + b$

$\ln \text{rate} = x \ln [\text{I}^-] + [\ln k' + y \ln [\text{H}_2\text{O}_2]]$ (this equation is used for data sets 1,2, and 3 with $[\text{I}^-]$ changing)
 $y = m x + b$ (What does the value of m correspond to?)

$\ln \text{rate} = y \ln [\text{H}_2\text{O}_2] + [\ln k' + x \ln [\text{I}^-]]$ (this equation is used for data sets 3,4, and 5 with $[\text{H}_2\text{O}_2]$ changing)
 $y = m x + b$ (What does the value of m correspond to?)

Part 1 Trials: Do Not Record Your Data on This Sheet. Use Your Laboratory Notebook.

Note: Be sure to use you use your data and the proper number of significant figures as dictated by the measuring device used, your data, and the calculations.

Solution number	Buffer (mL)	0.300 M KI (mL)	Starch (mL)	0.0200M Na ₂ S ₂ O ₃ (mL)	D.I. Water (mL)	0.1 M H ₂ O ₂ (mL)	Blue Time (s)	Total Volume (mL)
1	5.0	2.0	0.4	5.0	21.6	6.0		
2	5.0	4.0	0.4	5.0	19.6	6.0		
3	5.0	6.0	0.4	5.0	17.6	6.0		
4	5.0	6.0	0.4	5.0	13.6	10.0		
5	5.0	6.0	0.4	5.0	9.6	14.0		

Calculations:

Solution number	moles S ₂ O ₃ ²⁻	moles I ₂ formed	[I ₂]	rate $\frac{\Delta[\text{I}_2]}{\Delta t}$	[I ⁻] ₀	ln[I ⁻] ₀	[H ₂ O ₂] ₀	ln[H ₂ O ₂] ₀	ln(rate)	k units?
1										
2										
3										
4										
5										
k Average										

