

Kinetic Study of the Reaction Between H_2O_2 and I^-

Run	$[\text{I}^-]$ (M)	$[\text{H}_2\text{O}_2]$ (M)	$[\text{S}_2\text{O}_3^{2-}]$ (M)	Time (s)	Rate (M/s)	Rate Constant
1	0.020	0.020	5.0×10^{-4}	74	6.76×10^{-6}	0.0167
				76		
				75		
				75		
2	0.020	0.040	5.0×10^{-4}	37	1.34×10^{-5}	0.0168
				38		
				38		
				36		
3	0.020	0.020	1.0×10^{-3}	148	6.68×10^{-6}	0.0167
				150		
				151		
				150		
4	0.040	0.020	5.0×10^{-4}	36	1.37×10^{-5}	0.0171
				36		
				37		
				37		
5	0.040	0.040	1.0×10^{-3}	37.2	2.69×10^{-5}	0.0168

1. First find the average time for the color change in trials 1-4 and use it to calculate the rates for these trials.
2. Comparing trials 1 and 2 shows that doubling the concentration of H_2O_2 doubles the rate; thus β is 1.
3. Comparing trials 1 and 3 shows that doubling the concentration of $\text{S}_2\text{O}_3^{2-}$ leaves the rate unchanged; thus γ is 0.
4. Comparing trials 1 and 4 shows that doubling the concentration of I^- doubles the rate; thus α is 1.
5. Knowing that the rate law is $\text{Rate} = k[\text{I}^-][\text{H}_2\text{O}_2]$, calculate k for trials 1-4 and find the average rate.
6. Knowing that the rate is $\text{Rate} = k[\text{I}^-][\text{H}_2\text{O}_2]$, calculate the rate for trial 5 and the time for the color change.