

Chemistry 254
Experiment 6
First order reactions

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Abstract

In this practical the reaction rate of a first order reaction is investigated with a focus on determining the reaction rate constant and half life.

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1 Results

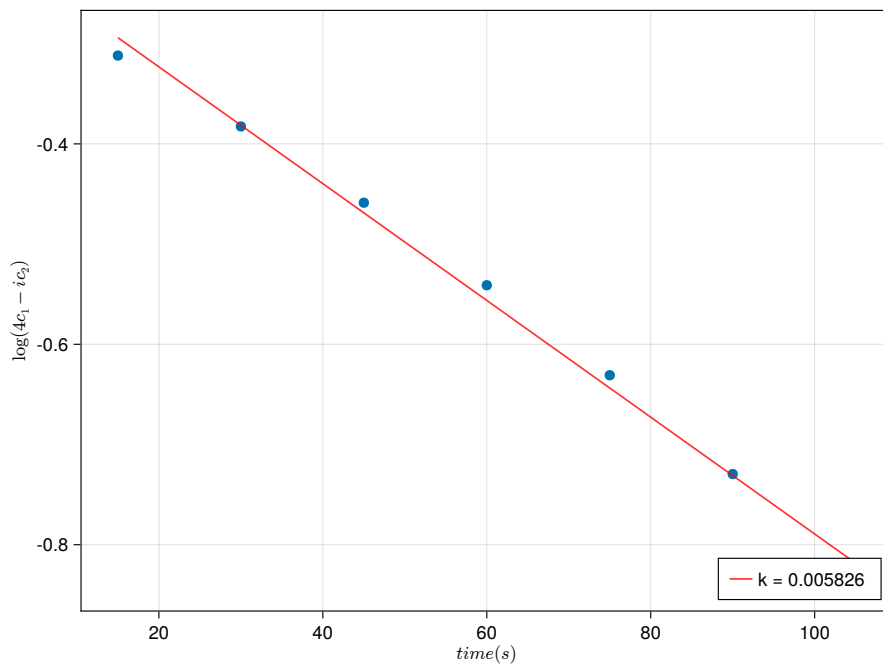


Figure 1: $\ln(4c_1 - ic_2)$ over reaction time

From figure 1 the reaction rate constant was determined to be 0.005826

Table 1 show the reaction rate constants for all samples with their respective reaction times. The mean value for k 0.004967 with a standard deviation of 0.0004473

Table 1: Reaction rate constants

Reaction time	k
15	0.004403
30	0.004559
45	0.004730
60	0.004920
75	0.005133
90	0.005374
105	0.005648

The concentration of Hydrogen peroxide was found to be 0.1955 *M*

A static export of the notebook containing all analysis and figures is available at https://adammenne.github.io/chemistry_254/practical_6/notebook.html.
With full source code available at https://github.com/AdamMenne/chemistry_254/tree/master/practical_6

2 Discussion

While the *k* values have relatively low standard deviation they do increase proportionally to reaction time. Notably the value determined using figure 1 is slightly higher than the highest value shown in table 1.

Accuracy could be increased with a larger sample size, and a more consistent method of identifying reaction times.

Appendix A MSDS

Potassium iodide

- Harmful
- may cause skin and eye irritation
- if in contact with skin or eyes wash for several minutes

Sodium thiosulfate

- Harmful
- causes skin, eye, and respiratory irritation
- if in contact with skin or eyes wash for several minutes

Acetic acid

- Flammable, corrosive
- causes skin burns and eye damage
- if in contact with skin or eyes wash for several minutes

Hydrogen peroxide

- Oxidising, corrosive, harmful
- do not ingest or inhale
- may cause skin burns, eye damage
- if in contact with skin or eyes wash for several minutes