

Protocol
K4 - Oxalic Acid Oxidation

Group F
Jonas Adamer (12225913)
Florian Fitsch (12218283)
Leonhard Ritt (12208881)

Date of experiment: 2024/10/21
Date of submission:

Contents

1	Objective	2
2	Experiment	2
2.1	Determination of Absorption Maximum of KMnO_4	2
2.2	Creation of Calibration Curve for KMnO_4 Concentration	2

1 Objective

In this assignment, the kinetics of chemical reactions are studied through two separate experiments.

In the first experiment, the redox reaction between oxalic acid and potassium permanganate is studied: After determining the absorption maximum of potassium permanganate, a series of solutions is produced and measured as a calibration for concentration of permanganate as a function of absorption. Finally, the change in permanganate-concentration is measured in-situ, both with and without a catalyst, in order to determine the reaction order.

In the second experiment, the acid-base reaction between phenolphthalein and sodium hydroxide is studied. The absorption of the reaction mixture is also measured in-situ and the reaction order regarding phenolphthalein determined.

2 Experiment

2.1 Determination of Absorption Maximum of KMnO_4

In order to find the absorption maximum, 79 mg of potassium permanganate were weighed out, dissolved in deionized water and diluted in a 50 mL volumetric flask, yielding a 0.01 M solution. 5 mL of this solution were taken out and once again diluted in a 50 mL flask, yielding a concentration of 0.001 M.

2 mL of the prepared solution were filled into a cuvette and inserted into the photometer. Its Absorption was then measured in wavelength increments of 10 nm between 450 nm and 600 nm. For each wavelength, the photometer was calibrated by setting values of 0% and 100% transmission, using an opaque block and a cuvette filled with deionized water, respectively. Since high absorptions were measured at 530 nm and 550 nm, another series of measurements was taken between 520 nm and 560 nm with increments of 2 nm. Using this process, a maximum at 532 nm was determined.

2.2 Creation of Calibration Curve for KMnO_4 Concentration