Abstract

In lab, the ability to pipette and dilute concentrations is key. This lab was designed to do just that. Learning the methods of quantitative analysis using a spectrophotometer was also one of the main focuses.

Introduction

Pipetting is a complicated task, but it is the most accurate way of measuring a specific quantity. KMnO4 solution is a purple substance that stains very easily. The lab was done to determine the different absorbencies for different dilutions. There are also two unknown amounts that the concentration and absorbency must be determined following some simple procedures will help figure it all out. In this paper, the methods and results will show the steps and findings in this experiment.

Methods

Material used:	60-75ml of KMnO4 at a 0.0050M
	DI Water
	Two unknown solutions
Equipment used: pipettes	6 100ml volumetric flasks and stoppers 1, 2, 4, 5, and 10ml
	Hach DR2400 spectrophotometer meter

Procedures

Take 1ml, 2ml, 4ml, 6ml, 8ml, and 10ml of stock solutions of the KMnO4 and dilute each of these to 100ml with DI water, cap the flask and mix thoroughly. Then set up and calibrate the HACH DR 2400 meter at a wavelength of 526nm. Starting with the 1ml flask of solution, fill a cuvette with each sample making sure to use the kimwipes while handling the cuvettes to keep all fingerprints and smudges off the container, begin getting the results from the HACH and recording them. After all measurements have been collected, discard all remaining materials in properly marked containers.

Results

After collecting the raw data, calculate the concentration of each standards by applying the appropriate dilutions factor with this formula:

Stock solution * ml of stock/100ml = concentration

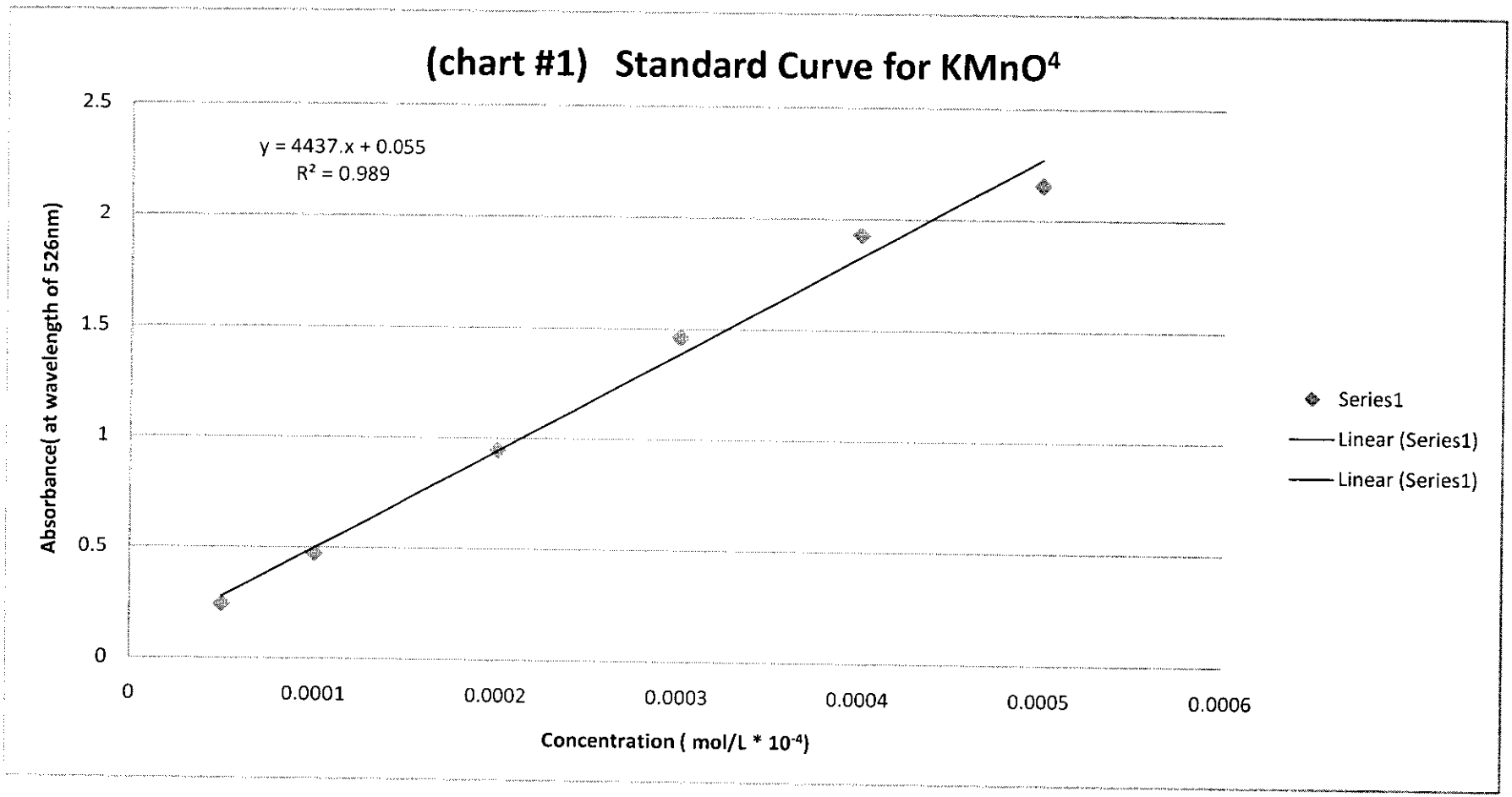
Enter your data into excel to construct a standard curve by plotting the absorbance versus the concentration. (See Chart 1) Using the chart, the absorbance of the unknowns can be calculated. Unknown 1 was found to be 0.00015M and unknown 2 was found to be 0.00026M.

Discussion

In addition to finding out the Absorbance of the unknowns the concentrations were found using the formula in the procedures. The results show that the absorbency was higher for each dilution that was higher. When plotted on a chart, it gave almost a straight line. Getting the results for the 4ml solution had to be redone due to the incorrect results shown in the chart when plotted. It showed that pippeting and diluting is not a simple as one may think.

Conclusion

Different ml stock of 0.0050M of KMnO4 was diluted in different concentrations to measure the absorbency using a HACH DR2400 spectrometer. Beginning with pipetting, steps were followed that taught the importance of pipetting and diluting. It isn't as easy as it appears.


(chart #1) Standard Curve for KMnO4
y = 4437.x + 0.055
R² = 0.989
Absorbance(at wavelength of 526nm)
2.5
2
1.5
1
0.5
0
0
0.0001
0.0002
0.0003
0.0004
0.0005
0.0006
Concentration (mol/L * 10-4)
Series1
Linear (Series1)
Linear (Series1)