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**Spectrophotometry Lab: How does the change in the concentration of phenolphthalein
affect its absorbance**

Student's Name

Institution

Course

Professor's Name

Date

Spectrophotometry Lab: How does the change in the concentration of phenolphthalein affect its absorbance

Abstract

The spectrophotometry lab experiment concentrated on finding the effect of changing the concentration of phenolphthalein on its absorbance. An experiment was carried out in the lab where the concentration of phenolphthalein changed from 0.004, 0.002, 0.001, 0.0005, and 0.0 M, and the absorbance was measured with a UV-visible spectrophotometer (180 – 800 nm). The results indicated that there is a direct relationship between the two variables. The graph of concentration against absorbance had an increasing trend line that suggested that there was a direct relationship.

Introduction

Spectrophotometry is a type of experiment that measures how much a chemical substance absorbs light energy when the intensity of the beam of light passing the substance is measured. It is known that a certain substance or compound transmits or absorbs light at a given wavelength. Spectrophotometry is used in qualitative substance analysis in biochemistry, chemistry, biology, chemical engineering, physics, industrials, and clinical applications (Pellenz et al., 2023). According to Beer-Lambert's law, there is a direct association between the absorbance and concentration of a given solution (Mayerhöfer et al., 2020). The law is represented by the formula below;

$$A = \epsilon \times I \times c$$

Where ϵ is the absorption coefficient, A is absorbance, and I is the path length. I and ϵ are constants of the equation and are proportional to the given concentration.

Materials and method

1. UV-visible spectrophotometer (180 – 800 nm)
2. Photocell
3. Triangular Prism
4. Lens
5. Source of light
6. Cuvette
7. Wavelength selector with a slit
8. Digital display
9. Different concentrations of phenolphthalein (0.004, 0.002, 0.001, 0.0005 and 0.0 M)

Results

Table 1: raw data of absorption spectrum of phenolphthalein

Absorbance	[pHp] (M)
3.498	0.004
3.267	0.002
1.86	0.001
0.851	0.0005
0	0

The data recorded from the digital display indicates that an increase in the concentration of phenolphthalein indicator increased its absorbance of light.

Graph

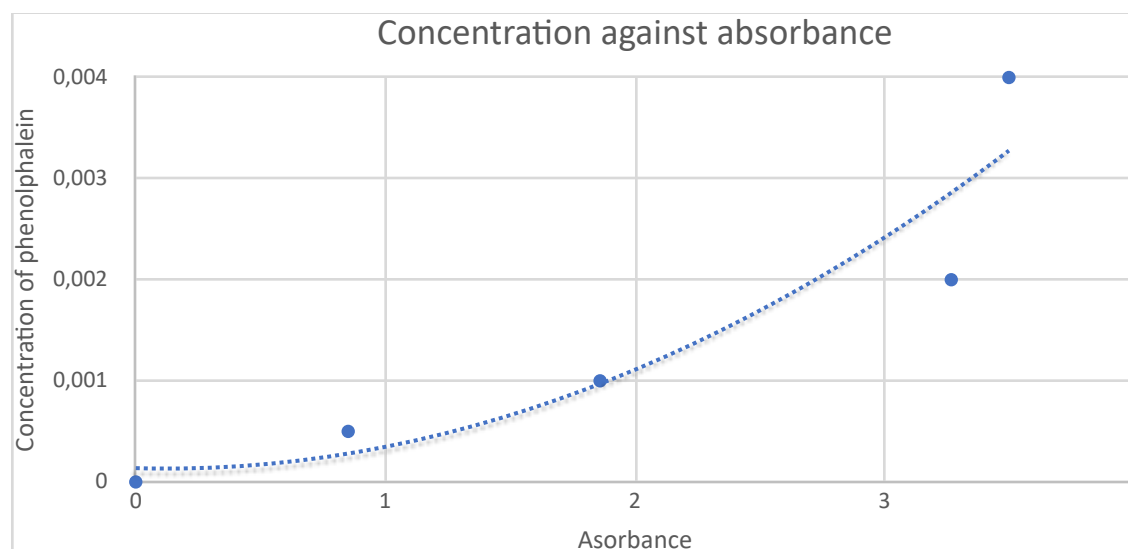


Figure 1: Graph of concentration against absorbance

The graph above shows the relationship between the concentration of phenolphthalein and absorbance. It shows that an increase in the concentration of phenolphthalein causes its

absorbance on the spectrophotometer to increase. There is a direct relationship between absorbance and concentration of the phenolphthalein.

Conclusion

The lab report aimed to find the effect of changing the concentration of phenolphthalein on its absorbance. A spectrophotometry lab was conducted, and the results indicated a direct relationship between the two variables. The graph of concentration against absorbance had an increasing trend line that suggested a direct relationship.

References

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- Pellenz, L., de Oliveira, C. R. S., da Silva Júnior, A. H., da Silva, L. J. S., da Silva, L., de Souza, A. A. U., ... & da Silva, A. (2023). A comprehensive guide for characterization of adsorbent materials. *Separation and Purification Technology*, 305, 122435.



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