Riverside Community College

Physics 4-C

LABORATORY REPORT 8

Brewing coffee

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Professor

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1 Introduction

This lab's goal will be to experimentally find what temperature absolute zero is at in °Celsius .

2 Methodology

2.1 Setup

1. We will use a container that will hold water.
2. A Vernier wireless thermometer will also be used.
3. With a pressure gauge to be placed over the container so that the pressure gauge ball is inside the container.

2.2 Procedure

Since our pressure gauge's ticks are marked in differences of 5 kPa we will tabulate each difference of 2.5 kPa, half a tick, with their corresponding temperature.

1. We started off by boiling enough water to cover the pressure gauge ball.
2. We tabulated each interval of 2.5 kPa with the corresponding temperature until we reached 105 kPa.

3 Data

Tabulating and graphing our values:

°C	kPa
84.4	122.5
76	120
68.6	117.5
61.7	115
55.9	112.5
49.0	110
34.5	105

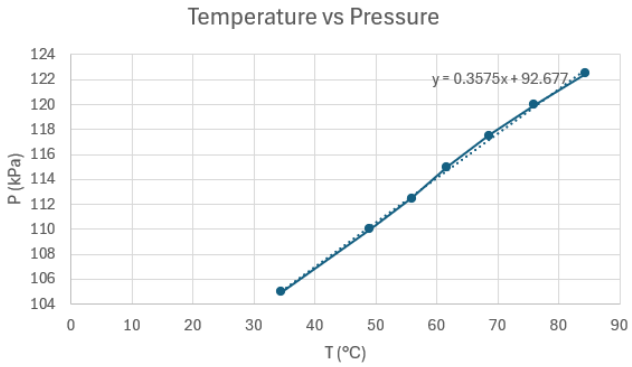

Figure 1: Temperature vs Pressure graph

4 Analysis

4.1 Calculations

1. We started off with the ideal gas law equation where $P \times V = nkT$. Where k is the Boltzmann constant, and T the temperature in kelvin.

2. We then re arrange the equation to emphasize the linear relationship of the ideal gas law $P = \frac{n \times k}{V} \times T$. Where it parallels $Y = m \times x + B$

3. When we graph and ask excel for the least square regression line, we receive the following equation : $P = 0.3575 \times T + 92.677$.

4. If we want to find what Temperature absolute zero is or other words when P = 0 , we will have to solve for the temperature when the pressure is zero .

5 Result

We found our absolute zero to be -259 °Celsius. When we averaged our value with the attendees of the 5/6/2024 lab it resulted in an average of -271 °Celsius.

6 Conclusion

With this experiment we experimentally the absolute 0 point with funny enough hot water!

One thing to note with our data is that there might be slight discrepancy's as when we lowered the temperature by pouring out water we poured out too much as we missed the 107.5 kPa point.

7 References

[1] Dr. Russel's Lecture 5/6/24, Riverside Community College.

Special thanks to Kanye West for providing me with music whilst writing this report.