

Fuels and Paraffin Wax

Introduction

Paraffin wax is an example of a saturated hydrocarbon. It contains only the elements _____ and _____ and its bonds are all _____ covalent.

Most compounds of this type are quite unreactive, but they do burn and are widely used as fuels in various applications.

The burning of such compounds produces water vapor, carbon, carbon monoxide, and carbon dioxide in varying proportions, depending on the amount of oxygen available.

The amount of heat generated per mole of compound burned is also depended on the oxygen available.

In this exercise, you will determine the amount of heat energy associated with the combustion of the paraffin in a candle.

Objective:

To measure experimentally the amount of heat generated by burning the paraffin in a candle.

Planning:

1. Design a procedure using appropriate apparatus and materials. You may use a diagram to help explain your procedure. Your method must allow for the control of necessary variables and must allow you to collect sufficient relevant data to calculate the heat of combustion for paraffin. (Assume paraffin is represented by the formula $C_{20}H_{42}$ (aka eicosane). Design a table to hold the data.

Data Collection:

2. Collect data in an appropriate manner making note of all quantitative and qualitative observations. Include units and uncertainties where you feel they are appropriate.

Data Analysis:

3. Determine the heat of combustion of paraffin in J/g and J/mol. Take into account any errors and uncertainties.

Evaluation:

4. Evaluate the data, stating your conclusion and remembering to compare your result with that found in the literature. (Use $-13,360 \text{ kJ/mol}^{-1}$ unless you can find a better value elsewhere... which might be worth a bonus to you).
5. Discuss your value. Is it high or low and why. You should evaluate your procedure, apparatus, manipulations and calculations and make suggestions on how to improve any weaknesses you have pointed out.