

agrupamento de escolas da maia



Energy of Biomass Derived Compounds

Sofia G. Pereira¹, Wendel W. Souza¹, Ana Luísa R. Silva²

¹ Escola Secundária da Maia, Maia, Portugal

² Centro de Investigação em Química da Universidade do Porto, Porto, Portugal

Introduction

In this project, it is intended to study the chemical behavior of molecules from biomass, which can be used in the synthesis of new chemicals and biofuels. Thus, it is necessary to know some physicochemical properties of these molecules, such as the combustion energy. These data are very useful in the chemical and biochemical industry, as they help to make better use of the resources coming from biomass for the production of compounds of high commercial value. The sustainable production of new products from biomass, instead of using raw materials from fossil fuels, will help to preserve the environment.

The study of the chemical species, 4-methoxy-1-indanone, was carried out, and will be used as a model molecule to predict the properties of related compounds, reducing the time of search for the molecules alone.

Methodology

The experimental procedure was carried out in two stages:

Compound purification:

The sublimation technique under reduced pressure was used to purify the sample. The analysis of the degree of purity was performed by gas-liquid chromatography.

Combustion energy:

The static bomb combustion calorimetry technique was used to determine the combustion energy of 4-methoxy-1-indanone.

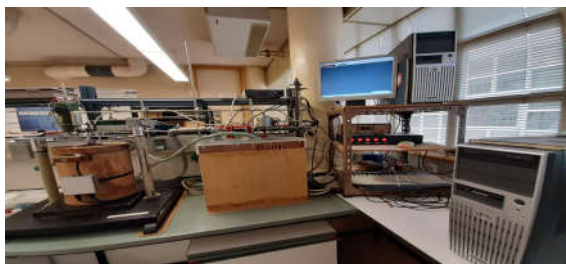


Figure 1: Calorimetric System (Author's collection)

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Results

From the graph we obtained the value of ΔT using the formula, $\Delta U = C_v (\text{calorimeter}) \times \Delta T$ and the value of the energy of combustion of 4-methoxy-1-indanone

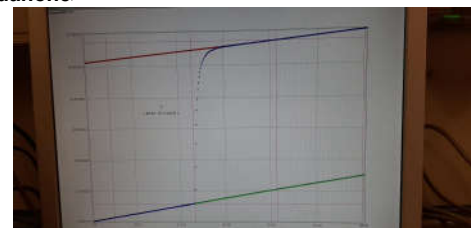


Figure 2: Graph Temperature versus time. (authors's collection)

Experiência	1	2
m (composto)	0,48684	0,49157
Ti/C	25,00139	25,00037
Tf/C	26,41561	26,36984
TΔ/K	1,34825	1,30199
ΔUcombustão(kJ/mol)	-5046,97	-5046,96

Figure 3: Table with the obtained values.

Conclusions

In this work it was possible to follow a project on the energy study of biomass derivatives and obtain a provisional value for the combustion energy of 4-methoxy-1-indanone, -5046,97 kJ/mol.

Other properties must be determined to better understand this molecule from a chemical point of view. The development of this study, for the universal database, allowed the use of these molecules in the production of new products and fuels, contributing to the reduction of the impact that man has caused in the environment.