

THE UNIVERSITY OF ZAMBIA
SCHOOL OF NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY

CHE2511: BASIC ORGANIC CHEMISTRY
STUDENT GUIDE FOR WRITING THE LAB REPORT

15th April, 2019

EXPERIMENT # 3

1.0 Aim: To prepare (or synthesise) 2-Chloro-2-methylpropane from *Tert.*-butanol.

2.0 Introduction: *To include the following points:*

Alkyl halides can be prepared from alcohols by several methods including reaction with ----- (at least 3 reagents)

In this experiment, 2-Chloro-2-methylpropane was prepared by the action of hydrochloric acid on *Tert.*-butanol and characterised by ----- and -----.

Chemistry:

- (i) Give equation for chemical reaction
- (ii) Provide all steps of the reaction mechanism

3.0 Materials and Methods: (4 marks) *A sample is shown below:*

3.1 Materials used: List of chemicals *and* List of apparatus

3.2 Method

The method described in CHE2511 Lab. Manual, pages ----- was followed.

A clear and concise description of the method used in your own words (not more than 7 lines). Please do not copy from the lab manual.

Conc. HCl was cooled and the cold acid was transferred to a separatory funnel, allowed to react with ---. Then what -----.

2-Chloro-2-methylpropane was isolated from the reaction mixture by -----, drying the organic phase over ----- and ----- . The isolated product was purified by----- and characterised by ----- . Record b.p. range and mass.

4.0 Observations: List two relevant observations

5.0 Data Collected:

Data
Physical appearance of the product – physical state, colour, odour, homogeneity
Weight/ Volume of the product
Boiling point of the product: ---- - ----- °C
Literature boiling point of 2-Chloro-2-methylpropane:
Literature boiling point of <i>Tert.</i> -butanol:
Fractions collected at different temperatures: Volume and temperature range

6.0 Data Analysis:

Calculate % Yield of the product : show the calculations clearly.

Formula used: % Yield = [Actual Yield/ Theoretical Yield] X 100

7.0 Results:

2-Chloro-2-methylpropane was obtained as -----, b.p. ----- °C (Lit. b.p. ----- °C) in ----- % yield.

8.0 Discussion: In addition to other relevant points, discussion should focus on:

(a) *Brief discussion on the purity of the product obtained:*

To include homogeneity and narrow b.p. range of the product.

(b) *Discussion on identity of the product*

The product obtained was/was not 2-Chloro-2-methylpropane because -----.
(compare the physical appearance and b.p. range of the product that of pure 2-Chloro-2-methylpropane and *Tert.*-butanol)

(c) Any other relevant points such as challenges observed, precautions taken etc.

(d) Comment on % yield.

9.0 Conclusion

The isolated product was /was not found to be 2-Chloro-2-methylpropane. If it was not 2-Chloro-2-methylpropane, suggest the identity of the product based on your comparison of b.p., general appearance and any other property.

10. References: List the books and other sources that were used to write this lab report in a standard format.

11.0 Exercise: Answer the questions listed under exercise for this experiment.