

CHEM101 Report for Laboratory Exercise #5

Synthesis of Tetramethylammonium Triiodide and Tetramethylammonium Pentaiodide

Using Microsoft Word, students are to **insert responses in all yellow highlighted areas**. It is recommended that the report be completed without changing font size, column width, row width, margins, and highlights. The completed report must be uploaded to the CHEM 101 Brightspace site as a .pdf file by the due date posted on Brightspace. All answers must be the student's work without assistance from others. Only reports which are completed using this template will be marked.

Name: Kevin Britto Lab Section: B01 Quad 2 Date: June 19, 2024

Abstract

By reacting iodine (I_2) with tetramethylammonium iodide (NMe_4I) in solution with control of the reaction stoichiometry, tetramethylammonium triiodide salt (Me_4NI_3) and tetramethylammonium pentaiodide salt (Me_4NI_5) were synthesized. The % yield for Me_4NI_3 was 52.2%, and the % yield for Me_4NI_5 was 82.6%.

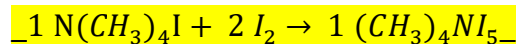
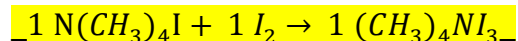
Data/Results

Table 1. Experimental data and calculated values for the preparation of Me_4NI_3 and Me_4NI_5

Synthesis	Me_4NI_3	Me_4NI_5
NMe_4I (g)	0.498	0.499
I_2 (g)	0.496	1.301
actual yield (g)	0.464	1.451
theoretical yield (g)	0.889	1.757
% yield	52.2%	82.6%

Discussion Respond to the following:

Write the balanced chemical equations for the formation of each of the products:



In your own words, describe the determination of the limiting reagent in each of the preparations. (max. 5 lines)

The limiting reagent is determined by finding which of the two reagents used in the reaction had the least amount of reacting moles. As a result, the one with the least reacting moles was determined to be the limiting reagent.

Discuss the meaning of the % yield in your own words, do not just give a formula. Comment on the % yield observed for each of the products, including the actual values (max 4 lines).

_ The percent yield compares the amount of product that I created from the experiment (experimental yield) compared to the amount of product that would be created in a perfect reaction (theoretical yield). A high percent yield indicates a fully finished reaction. My percent yield for MeNI_3 was 52.2% and 82.6% for Me_4NI_5 respectively. _

Provide the limiting reagent for each of the preparations.

_ $(\text{CH}_3)_4\text{NI}_3$ limiting reagent is I_2 _

_ $(\text{CH}_3)_4\text{NI}_5$ limiting reagent is $\text{N}(\text{CH}_3)_4\text{I}$ _

Conclusions

See page 12 of the lab manual on how to write the conclusions. (max. 2 lines)

_ My first experiment creating Me_4NI_3 was not very successful with a percent yield of 52.2%. My second experiment creating Me_4NI_5 was more successful with a percent yield of 82.6%. _

References

See page 12 of the lab manual on how to format references. Do not forget to cite in the text.

_ 1. Reimer, M. et al, Laboratory Manual, Chemistry 101, pp. 35-38. (University of Victoria: Victoria, B.C.). Summer 2024. _

2. Iodine. Bio Basic, Lot Number: N9812260

3. Tetramethylammonium iodide. Aldrich, St. Louis, MO, 63103, Lot number: MKCK8490. _

Feedback Summary	max.
Pre-lab quiz: Are all responses correct?	4
Laboratory Notebook: Have all data, observations, and procedures been recorded?	1
Report: Are all sections completed accurately? Are responses in the Discussion, correct? Does the conclusion only include the appropriate information? Are the References correctly formatted and cited?	3
Participation: Did the student come prepared, was the time used well in the lab and was the student engaged in the experiment? Did the student show the email confirmation letter and request the TA to check their drawers for completeness before they left the lab?	1
Performance evaluation: Did the student follow the safe practice guidelines throughout the whole lab period?	1
Total mark	10

