

Lab report

**Synthesis of Tetramethylammonium
Triiodide**

TO

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Abstract

In this experiment we will determine what will effect from the reaction and what the mole of the compound. The crystals, tetramethylammonium triiodide, were successfully synthesized from the reaction of tetramethylammonium iodide with iodide. The result of the solution we will know the weight of the compound after it's dry and know how to calculate the mole. The shape of the crystal is needle, the colour of it is a mixture of purple and dark green color. The limiting agent in the experiment is iodide. The percent yield is 61.68%

Introduction

Chemical equation is the symbolic representation of a chemical reaction in the form of symbols and formula, wherein the reactant are given on the left-hand side and the product on the right-hand side. In this experiment, the chemical equation is $\text{Me}_4\text{N}^+\text{I}^- + \text{I}_2 \longrightarrow \text{Me}_4\text{N}^+\text{I}_3^-$. Mole is the unit of measurement. It is defined as the amount of a chemical substance that contains as many elementary entities such as atoms, molecules, ions, electrons, or photons, as there are atoms in 12 grams of carbon-12 (^{12}C), the isotope of carbon with relative atomic mass 12 by definition. This number is expressed by the Avogadro constant, which has a value of 6.022×10^{23} . Limiting agent is the reactant that used up first in a reaction. Percent yield is the describes of the proportion of the actual yield to the theoretical yield. Crystallization is a separation technique that is used to separate a solid that has dissolved in a liquid and made a solution. The purpose of this experiment is study and to form crystallization using tetramethylammonium iodide with iodine. To calculate the limiting reagent and % yield.

Objective

1. To study the crystallization, to study the mole calculation, to study the limiting agent identification, and to study the yield of experiment work calculation.

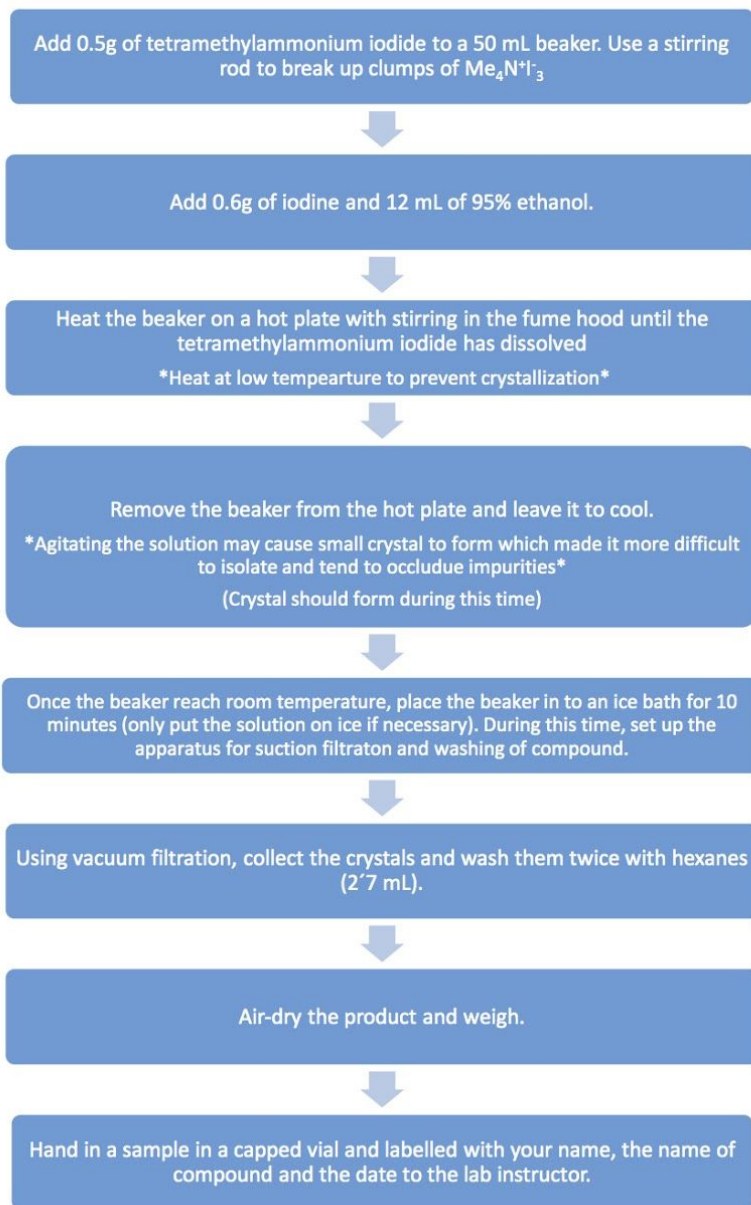
Materials

- Tetramethylammonium iodide
- Ethanol
- Iodine

Instruments

- Filter paper
- Stirring rod
- Plate
- Fume Hood
- Beaker
- Funnel
- Weight Balance

mETHODS



Results



Weight of paper = 0.57g

Weight of crystal+paper = 1.23g

Weight of crystal only = $1.23 - 0.57 = 0.66\text{g}$

Characteristic = It has a needle shape. The colour is a mixture of purple and dark green color.

Substance	Gram	Mole
Tetramethylammonium Iodide	0.5	2.5×10^{-3}
Iodine	0.6	2.4×10^{-3}
Tetramethylammonium Triiodide	0.66	1.5×10^{-3}

DISCUSSION

The chemical equation of this experiment is $\text{Me}_4\text{N}^+\text{I}^- + \text{I}_2 \longrightarrow \text{Me}_4\text{N}^+\text{I}_3^-$. The reactants are tetramethylammonium iodide and iodine. The products are Tetramethylammonium Triiodide. There are 1.1 g and 4.9×10^{-3} moles of reactants were used in the reaction. There are 0.66 g and 1.5×10^{-3} moles of products from the experiment. The Limiting reagent is the substance that is totally consumed when the chemical reaction is complete. In this experiment, the limiting reagent is iodine. We expected about 1.07 g of products from the experiment. But the results is less than our expectation. Because it is grouping together. The error may occur in the experiment because the weight of the object is not stable. We can improve and prevent the error by when we measure the weight, we must keep it accuracy. We should not place anything on the table while we measuring the weight.

0.5 g of Tetramethylammonium iodide	1 mol of Tetramethylammonium iodide	1 mol of Tetramethylammonium Triiodide	454.9 Tetramethylammonium Triiodide
	201.0 g	1 mol of Tetramethylammonium iodide	1 mol of Tetramethylammonium Triiodide

$$\frac{0.5 \times 1 \times 1 \times 454.9}{201.0 \times 1 \times 1} = 1.13 \text{ g}$$

0.6 g of iodide	1 mol of iodide	1 mol of Tetramethylammonium Triiodide	454.9 Tetramethylammonium Triiodide
	253.8 g of iodide	1 mol of iodide	1 mol of Tetramethylammonium Triiodide

$$\frac{0.6 \times 1 \times 1 \times 454.9}{253.8 \times 1 \times 1} = 1.07 \text{ g}$$

Percentage Yield

$$\frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100 = \text{--- \%}$$

$$\frac{0.66 \text{ g}}{1.07 \text{ g}} \times 100 = 61.68\%$$

Conclusion

The crystal have needle shape and its color is a mixture of purple and dark green color. The mole of tetramethyl iodide, iodide and Tetramethyl ammonium triiodide are 2.5×10^{-3} , 2.4×10^{-3} and 1.5×10^{-3} respectively. The limiting reagent is iodide. The percentage yield in this experiment is 61.68. %

References

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