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Anion Recoqnition Reactios

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Abstract
In the recognition of anions there are several anions that are tested so that we can recognize the anions. This praticum aims to be able to analyze various kinds of anions in a sample and write down the reaction. This praticum aims to be able to analyze various kinds of anions in a sample and write down the reaction. Analysis of this anion using the method of organoleptic methods Organoleptic properties are properties that can be measured by the senses, for example, taste, aroma, color, and so on There are several types of anions found in the samples tested. These finding implays indicate the formation of deposits and 2 phases formed during the test.

INTRODUCTION

Qualitative analysis means detecting the presence of a chemical element in an unknown snippet. Qualitative analysis is one of the most effective ways to study chemistry and its elements and ions in solution. In the qualitative analysis method, we use several reagents including group reagents and specific reagents, these two reagents are carried out to determine the type of anion / cation of a solution.

There are several methods for analyzing the presence of anions and cations in a solution. One of them is the organoleptic method. Organoleptic properties are properties that can be measured by the senses, for example, taste, aroma, color, and so on. So that organoleptic testing is a method whose principle is based on the observation of the color, smell and shape of the sample that indicates the presence of cations and anions in a solution or substance.

Anions are grouped into several classes including:

1. Simple anions such as: O^{2-}, F^{-}, CN^{-}, I^{-}, Cl^{-}, Br^{-}
2. Discrete oxo anions such as: NO^{3-}, SO_4^{2-}, CO^{3-}, NO^{2-}
3. Oxo polymer anions such as silicates, borates, or condensed phosphates
4. Anion halide complexes such as TaF_6 and anion-based anion complexes such oxalates. *(Analytical Chemistry Team, 2019)*

Qualitative analysis means detecting the presence of a chemical element in an unknown snippet. Qualitative analysis is one of the most effective ways to study chemistry and its elements and ions in solution. In the qualitative analysis method we use several reagents including group reagents and specific reagents, these two reagents are carried out to determine the type of anion / cation of a solution.

The definition of qualitative analysis is a chemical examination of the types of elements or ions contained in a single substance or a mixture of several substances. Qualitative analysis can conventionally be carried out visually, both in dry and wet conditions. In the dry state analysis can be carried out through the recognition of shapes and colors, odors, as well

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as flames. *(A. Bianchi, 2017)*

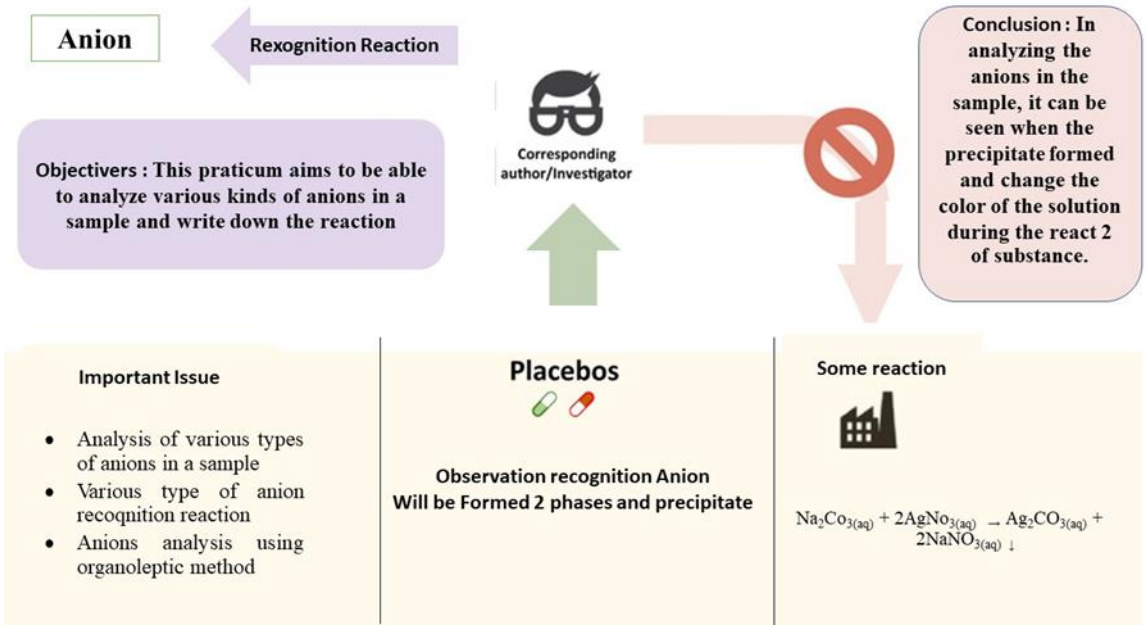
In wet analysis, the first step is to dissolve the sample with the appropriate solvent. The first solvent used is water, if the sample is insoluble in water, then hydrochloric acid, nitric acid and king water can be used.

The regensia groups used for the most common cation classifications are hydrochloric acid, hydrogen sulfide, ammonium sulfide, and ammonium carbonate. This classification is based on whether a cation reacts with these reagents by forming a precipitate or not. While the method used in anions is not as systematic as cations. But the scheme used is not a rigid scheme, since anions belong to more than one group. Qualitative analysis uses two kinds of tests, namely dry reactions and wet reactions. Dry reactions can be used on solids and wet reactions for substances in solution. *(Babatunde,2019)*

Settling Reaction a precipitate is a substance that breaks away as one solid phase comes out of the solution. The precipitate may be crystalline or colloidal, it can be removed from the solution by filtration. A precipitate is formed if the solution becomes oversaturated with the substance in question. The solubility of a precipitate by definition is equal to the molal concentration of its saturated solution. Solubility depends on various conditions, such as temperature, pressure, concentration, and solvent composition. *(Amendol, 2018)*

Temperature rise can generally magnify the solubility of deposits except in some deposits, such as calcium sulfate. Solubility depends also on the properties and concentration of other substances, especially the ions in the mixture. Other such materials are known to be allied ions and foreign ions. An allied ion is an ion that is also one of the precipitating materials. Generally, the solubility of the precipitate decreases in the presence of allied ions. In the presence of foreign ions the solubility of the precipitate increases, but this addition is generally slight. Except when a chemical reaction occurs. *(C. Garau, 2018)*

Recognition Reaction There are several methods for analyzing the presence of anions and cations in a solution. One of them is the organoleptic method. Organoleptic properties are properties that can be measured by the senses, for example, taste, aroma, color, and so on. So that organoleptic testing is a method whose principle is based on the color, smell and shape of the sample that indicates the presence of cations and anions in a solution or substance. *(Grell,2020).*



MATERIALS AND METHODS

Material will be use is $AgNO_3$ (aq), H_2SO_4 (aq), Pb $(NO_3)_2$(aq), Na_2CO_3(aq), $FeCl_3$(aq), Na_2SO_3 (aq), $Na_2S_2O_3$ (aq), KI (aq), KBr (aq). Methods from our practicum is:

1. Put 5 drops of Na_2CO_3 solution + 1 drop of $AgNO_3$ solution in test tube 1
2. Put 5 drops of Na_2CO_3 solution + 7 drops of $AgNO_3$ solution in test tube 2, Heat
3. Put 5 drops of Na_2SO_3 solution + 1 drop of $AgNO_3$ solution in test tube 3, then shake
4. Put 5 drops of Na_2SO_3 solution + 5 drops of $AgNO_3$ solution in test tube 4, then shake
5. Put 5 drops of $Na_2S_2O_3$ solution + 6 drops of $FeCl_3$ solution in test tube 5
6. Put 5 drops of KBr solution + 2 drops of Pb $(NO_3)_2$ solution in test tube 6
7. Put 5 drops of KI solution + 1 drop of $AgNO_3$ solution in test tube 7
8. Put 1 mL of KI solution + 4 drops of H_2SO_4 in test tube 8

RESULTS AND DISCUSSION

Result

Table 1. Observation

Reagents	Observation	Reaction
+ 5 drops Of Na_2CO_3 + 1 drops Of $AgNO_3$	2 phases are formed Top: White Powder Bottom: Colorless Solution Precipitated: Brown	$Na_2Co_{3(aq)} + 2AgNo_{3(aq)} \rightarrow Ag_2CO_{3(aq)} + 2NaNO_{3(aq)} \downarrow$
+ 5 drops of Na_2CO_3 + 7 drops of $AgNO_3$	Before Heated: Cloudly Precipitated: white After Heated: colorless Precipitated: brown grey	$Na_2Co_{3(aq)} + 2AgNo_{3(aq)} \rightarrow Ag_2CO_{3(aq)} + 2NaNO_{3(aq)} \downarrow$
+ 5 drops of Na_2SO_3 + 1 drop of $AgNO_3$	2 Phases are formed, cloudy Top: white Bottom: colorless Precipitad: white	$Na_2SO_{3(aq)} + 2AgNo_{3(aq)} \rightarrow Ag_2SO_{3(aq)} + 2NaNo_{3(aq)} \downarrow$
+ 5 drops of Na_2SO_3 + 6 drops of $AgNo_3$	2 Phases are formed, cloudy Top: white Bottom: colorless Precipitate: white	$Na_2SO_{3\ (aq)} + 2AgNo_{3\ (aq)} \rightarrow Ag_2SO_{3\ (aq)} + 2NaNo_{3(aq)} \downarrow$
+ 5 drops of Na_2S_2O3 + 6 drops of $FeCl_3$	No precipitate and solution color is pale yellow	$2Na_2S_2O_{3\ (aq)} + 2FeCl_{3\ (aq)} \rightarrow 2FeCl_{2\ (aq)} + Na_2S_4O_{6(aq)} + 2\ NaCl_{\ (aq)}$
+ 5 drops of KBr + 2 drops of $Pb(No_3)_2$	2 phaese are formed Top : white Bottom : colorless Precipitate : white	$Pb(No_3)_{2\ (aq)} + 2KBr_{\ (aq)} \rightarrow PbBr_{2\ (aq)} + 2KNo_{3\ (aq)} \downarrow$
+ 5 drops of KI + 1 drop of $AgNo_3$	2 phases are formed Top : cloudy Bottom : colorless Precipitate : white	$AgNo_{3\ (aq)} + KI_{\ (aq)} \rightarrow AgI_{\ (aq)} + Kno_{3c(aq)} \downarrow$
+ 1 ml KI + 4 drops of H_2SO_4	Colorless to cloudy green (No Precipitate)	$2KI_{\ (aq)} + 2H_2SO_{4\ (aq)} \rightarrow K_2SO_{4\ (aq)} + SO_{2\ (aq)} + I_{2\ (aq)} + 2H_2O_{\ (aq)}$

Discussion

In the anion recoqnition reaction practicum, which aims to analyze and fine out various kind of anions and anion reactions in a sample.

Based on the theory anions are grouped into several groups, namely:

1. Simple anions, such as O_2^-, F^-, CN^-, I^-, Cl^-, and Br^-
2. Discreate oxo anions, such as NO_3^-, SO_4^-, CO_3^-, and NO_2^-
3. Oxo-polymer anios, such as silicates, borats or condensed phosphate
4. Halide complex anios, such as: T_2F_6 and base anions complexes such as oxalate. *(Analytical Chemistry Team, 2019)*

From the grouping of anions above, we an find out the reactions of the solutions in the practicum that has been done, including which anions group.

1. When the Na_2CO_3 is added $AgNO_3$ will form a white precipitate and if $AgNO_3$ added more, it will form yellow precipitate and when heated it will foem a brown precipitate. This occurs because Na_2CO_3 and $AgNO_3$ react to form silver carboxilicacid and sodium nitrate. The reaction that occurs.

$$2\ AgNO_3 + Na_2CO_3 \rightarrow Ag_2CO_3 + 2\ NaNO$$

This indicates that the carbonate anions is present in solutions. Based on the theory the carbonate anions (CO_3^-) belongs to the discrete oxo anions. *(Babatunde, 2019)*

2. When the $Na_2S_2O_3$ is added of $FeCl_3$ the solutions will be change to bethadine color. Based on the theory this indicates that is thiosulphate ion which belong to the anions class of oxo polumers. Change in the colo of the solution due to the dissolutions oh $Na_2S_2O_3$ in $FeCl_3$. The reaction tht occurs.

$$2\ Na_2S_2O_3 + 2FeCl_3 \rightarrow 2FeCl2 + Na_2S_4O_6 + 2NaCl$$

3. When the Na_2SO_3 is added $AgNO_3$ will form a white precipitate and if added $AgNO_3$ more it will still form a white precipitate. This happens because the ions form two compounds react which results in the formation of solver sulphate precipitate. This indicates the presence of a slfhate ion (SO_4^-) which is also a discrete oxo anion. The reaction that occurs:

$$Na_2SO_3 + AgNO_3 \rightarrow Ag_2SO_3 + 2NaNO_3$$ *(Amendola, 2018)*

4. When the KBr is added the $Pb(NO_3)_2$ will form a white precipitate and the solution change from colorless to white, which indicates the presence of nitrate anions which belong to the discrete oxo anion. The formation of white precipitate due to the reaction that form potassium nitrate and lead 2 bromade. Reaction that occurs:

$$2KBr + Pb(NO_3)_2 \rightarrow 2KNO_3 + PbBr_2$$

5. When KI is added $AgNO_3$ will form a white Precipitate which also indicates the presence of nitrate ions formed and includes an oxo disket anions, this white precipitate is formed as a result of the reaction that form pottasiun nitrate. The reactions that occurs:

$$AgNO_3 + KI \rightarrow AgI + KNO_3$$ *(Grell, 2019)*

6. In the practicum when KI is added to H_2SO_4 no precipitate will form and there is no color change in the solution. Based on the theory when the H_2SO_4 dded by KI will form a H_2S precipitate. Which include that SO_4^- ions are presence. The reaction should be occurs:

$$8\ KI + 5\ H_2SO_4 \rightarrow 4\ K_2SO_4 + H_2S + 4I_2 + 4H_2O$$

Thw result in he practicum are not accordance with the theory. Thi is because there are severe error in during practicum. Such as adding to little substance so the result is hard to find and looked. *(Albrecht, 2021)*

CONCLUSIONS

After doing practicum about "Anion Rcoqnition Reation" can be conclude that:

1. In analyzing the anions in the sample, it can be seen when the precipitate formed and change the color of the solution during the react 2 of substance.
2. The reaction that occurs in above the experiment are:
   a. 2 AgNO3 + Na2CO3 □ Ag2CO3+ 2 NaNO
   b. 2 Na2S2O3 + 2FeCl3 □ 2FeCl2 + Na2S4O6 + 2NaCl
   c. Na2SO3 + AgNO3 □ Ag2SO3 + 2NaNO3
   d. 2KBr + Pb (NO3)2 □ 2KNO3 + PbBr2
   e. AgNO3 + KI □ AgI + KNO3
   f. 8 KI + 5 H2SO4 □ 4 K2SO4 + H2S + 4I2 + 4H2O

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