Chemistry | Inorganic Chemistry

Test for Bicarbonate Radical

General Aim

To test for the bicarbonate radical in inorganic salts.

Method

Detection of bicarbonate radical according to its physical properties, solubility, reaction with HCl, and confirmatory test.

Learning Objectives (ILOs)

- Recognize bicarbonate salts in powder form or solution.
- Apply the principles of safety measures
- Differentiate between carbonate and bicarbonate.
- Understand various tests to identify the anion present in a given salt.
- Understand the chemical reactions and their balanced equations that take place during each test.
- Acquire the skill to perform the experiment in the real lab once they understand different steps in the procedure.

Theoretical Background/Context

- Qualitative chemical analysis is a branch of chemistry that deals with the identification of elements or grouping of elements present in a sample. The techniques employed in qualitative analysis vary in complexity, depending on the nature of the sample. In some cases, it is necessary only to verify the presence of certain elements or groups for which specific tests applicable directly to the sample (e.g., flame tests, spot tests) may be available. More often the sample is a complex mixture and a systematic analysis must be made in order that all the constituents may be identified.
- It is customary to classify the methods into two classes: qualitative inorganic analysis and qualitative organic analysis.The sample is commonly dissolved in water for the determination of anionic constituents (i.e., negatively charged elements or groupings of elements) and cationic constituents (i.e., positively charged elements or groupings of elements).
- The procedure followed is based on the principle of treating the solution with a succession of reagents so that each reagent separates a group of constituents. The groups are then treated successively with reagents that divide a large group into subgroups or separate the constituents singly. When a constituent has been separated it is further examined to confirm its presence and to establish the amount present (quantitative analysis). Portions of the material are dissolved separately and different procedures are used for each to detect the cationic and anionic constituents.
- Qualitative analyses have applications in different fields especially the production of food, water, pesticides, petrochemicals, and pharmaceuticals. Bicarbonate is an important constituent in many pharmaceutical formulations especially antacids for the treatment of gastric diseases.

Principle of Work

The bicarbonate radical is among the first group of the acidic radicals in which hydrochloric acid is used as group reagent. In this experiment, the salt is dissolved in water to test its solubility in water then it will be tested with HCl. Afterwards, we will do confirmatory tests by heating the salt solution one time with mercury (II) chloride test reagent and another time with magnesium sulphate test reagent to confirm the presence of bicarbonate radical in the salt.