

Non aqueous titration

Presented By;-

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Non Aqueous Titration

In ordinary acid–base titrations, Water is used as the solvent. However, some substances:-

Are very weak acids or very weak bases, so they do not ionize enough in water for an accurate titration. **Solution:** Replace water with a **non-aqueous solvent** that promotes better solubility and stronger ionization of the analyte. Are **sparingly soluble** in water.

Definition:-Non-aqueous titration is a volumetric titration method carried out in a **solvent other than water.**

Types of Non Aqueous Solvents

Typically, there exist four types of solvents used in the non-aqueous titration of a given analyte. These are:-

1. **Aprotic Solvents** – These solvents are neutral in charge and are chemically inert. They also generally have a low dielectric constant. **Examples** of these types of solvents include chloroform and benzene.
2. **Protophilic Solvents** – These solvents have a basic character and tend to react with the acids they come in contact with, leading to the formation of solvated protons. **Examples** of protophilic solvents are ammonia and pyridine.
3. **Protogenic Solvents** – These solvents have a more acidic character and tend to have a levelling effect on the bases they come in contact with. **Examples** of protogenic solvents used in non-aqueous titration are sulphuric acid and acetic acid.
4. **Amphiprotic Solvents** – These solvents have properties which are protophilic as well as protogenic. **Examples** of these types of solvents are acetic acid and alcohols.

1. Acidimetry

Definition:- Acidimetry is the process of titrating an acid with a standard alkali solution to determine the concentration or amount of acid present.

Principle:- Based on the **neutralization reaction** between an acid and a base:



An **alkali of known strength** is used as the titrant.

Titrant:- Standard alkali: NaOH, KOH, Na₂CO₃.

Analyte:- Acid (strong or weak): HCl, H₂SO₄, acetic acid.

Indicators

Strong acid vs strong base: Phenolphthalein or methyl orange.

Weak acid vs strong base: Phenolphthalein.

Example:- Determination of HCl using 0.1 N NaOH with phenolphthalein indicator.

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2. Alkalimetry

Definition:- Alkalimetry is the process of titrating a base (alkali) with a standard acid solution to determine the concentration or amount of alkali present.

Principle:- Based on the **neutralization reaction**:



- An **acid of known strength** is used as the titrant.

Titrant:- Standard acid: HCl, H₂SO₄.

Analyte:- Alkali: NaOH, KOH, Na₂CO₃.

Indicators:-

- **Strong base vs strong acid:** Phenolphthalein or methyl orange.
- **Weak base vs strong acid:** Methyl orange.

Example:- Determination of NaOH using 0.1 N HCl with phenolphthalein indicator.



Estimation of Sodium benzoate and Ephedrine HCl

Link:- <https://pharmrecord.com/bp108p/>



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