

ANALYTICAL CHEMISTRY

Read the details of the information given below from Skoog and West's "Fundamentals of Analytical Chemistry" book, which is recommended as a reference.

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Applications of Neutralization Titrations

Reagents for Neutralization Titrations

Typical Applications of Neutralization Titrations

16A Reagents for neutralization titrations

Strong acids/bases  the largest change in pH at the eq. p.

Standard solutions for neutralization titrations
are always prepared from strong reagents.

16A-1 Preparation of standard acid solutions

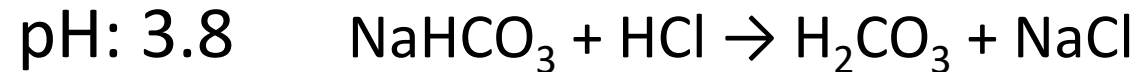
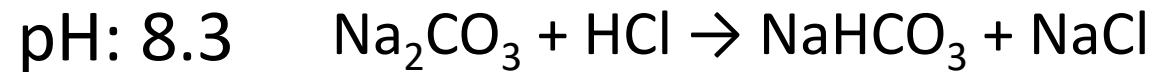
- **HCl** are widely used as standard solutions. Dilute solutions of HCl are stable indefinitely, and many chloride salts are soluble in aqueous solution.
- Solutions of **HClO₄** and **H₂SO₄** are also stable and are useful for titrations where chloride ion interferes by forming precipitates.
- Standard solutions of **HNO₃** are seldom used because of oxidizing properties.

16A-2 The standardization of acids

- Sodium carbonate, Na_2CO_3
- Tris-(hydroxymethyl)aminomethane, $(\text{HOCH}_2)_3\text{CNH}_2$ (TRIS)
- Sodium tetraborate decahydrate, $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$
- Mercury(II) oxide, HgO

Sodium carbonate

Two end points:



✓ The **second end point** is always used for standardization because the change in pH is greater than that at the first.

TRIS



Sodium tetraborate decahydrate

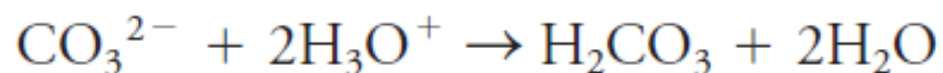
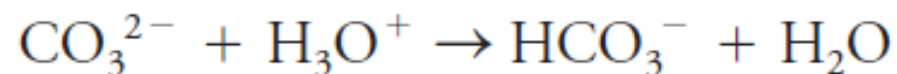


16A-3 Preparation of standard solutions of base

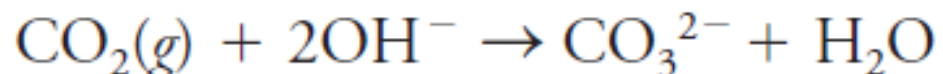
NaOH, KOH, and $\text{Ba}(\text{OH})_2$ are the most common base for preparing standard solutions.

These bases cannot be obtained in primary-standard purity, and so, all must be standardized after they are prepared.

The effect of carbon dioxide on standard base solutions



The hydroxides of sodium, potassium, and barium react rapidly with atmospheric carbon dioxide to produce the corresponding carbonate:



16A-4 The standardization of bases

- Potassium hydrogen phthalate, $\text{KHC}_8\text{H}_4\text{O}_4$
- Benzoic acid, $\text{C}_6\text{H}_5\text{COOH}$
- Potassium hydrogen iodate, $\text{KH}(\text{IO}_3)_2$