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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 46754-2025

**Pulps - Kraft cooking liquor and black liquor - Determination of
hydrosulphide ion concentration (potentiometric titration)**

纸浆 硫酸盐法蒸煮液和黑液 硫氢根离子浓度的测定（电位滴定法）

(English Translation)

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Table of Contents

Foreword
1 Scope
2 Normative references
3 Terms and Definitions
4 Principles
5 Reagents

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is modified to adopt ISO 23777:2023 "Determination of hydrosulfite ion concentration in pulp cooking liquor by potentiometric titration".

This document has undergone the following structural adjustments compared to ISO 23777:2023.

---6.2 corresponds to sections 6.2 and 6.3 of ISO 23777:2023;

---7.2.1 corresponds to 7.2 of ISO 23777:2023, and 7.2.2 corresponds to 7.3 of ISO 23777:2023.

The technical differences between this document and ISO 23777:2023, and the reasons therefor, are as follows.

---A composite electrode (see 6.2) was added to adapt to the technical conditions of instruments in my country.

The following editorial changes have been made to this document.

---The standard title has been changed to "Determination of Hydrosulfite Ion Concentration in Pulp Sulfate Process Cooking Liquor and Black Liquor (Voltage Titration Method)";

---The URLs for the ISO and IEC terminology databases have been removed;

---The references have been changed.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China National Light Industry Council.

This document is under the jurisdiction of the National Technical Committee on Standardization of Paper Industry (SAC/TC141).

1 Scope

This document describes a method for determining the concentration of hydrosulfide ions in sulfate cooking liquor and black liquor using potentiometric titration.

This document applies to the presence of hydrogen sulfide ions in white liquor, oxidized white liquor, green liquor, and black liquor with a solid content not exceeding 40% in sulfate pulping processes.

Measurement.

2 Normative references

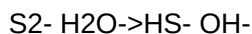
This document has no normative references.

3 Terms and Definitions

The following terms and definitions apply to this document.

The concentration of hydrosulfide ions in white liquor, black liquor, green liquor, or oxidized white liquor.

Note: Due to the hydrolysis reaction, S^{2-} ions are almost absent in the white liquor, oxidized white liquor, green liquor, and black liquor. The reaction is as follows.



4 Principles

Based on reaction equations (1) and (2), potentiometric titration was performed using silver nitrate solution.

$HS^- + OH^- + 2Ag^+ \rightarrow Ag_2S$ (black precipitate) H_2O (1) $CH_3S^- + Ag^+ \rightarrow AgCH_3S$ (yellow precipitate)
(2) According to reaction formula (3), sulfite ions are added to the sample solution to dissolve the existing polysulfide ions.

$nSO_3^{2-} + 3SnS_2 + H_2O \rightarrow nS_2O_3^{2-} + 3HS^- + OH^-$ (3) Therefore, each polysulfide ion contributes one sulfide ion to the sulfide ion concentration. Since the titration is performed in an alkaline solution, the sulfur...

Sulfate or sulfite ions will not affect the experiment.

According to reaction (4), when sulfite ions are added to organic polysulfides, mercapto

ions are generated.

$\text{CH}_3\text{SSCH}_3 \text{ SO}_2 \rightarrow \text{CH}_3\text{SSO}_3 \text{ CH}_3\text{S}$ -(4) Given a fixed initial sample volume, the concentration of hydrogen sulfide ions in the white, green, and black liquors ranges from 0.02 mol/L.

The concentration of sulfide ions in the oxidized white liquor ranges from 0.50 mmol/L to 50.00 mmol/L.

Precision data are available in Appendix A.

5 Reagents

Unless otherwise specified, analytical grade reagents should be used.