

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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**Soil. Determination of exchangeable acidity by potassium
chloride extraction. Titration method**

土壤 可交换酸度的测定 氯化钾提取-滴定法

(English Translation)

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Foreword

To implement the "Environmental Protection Law of the People's Republic of China", protect the environment, protect human health, and regulate the monitoring of exchangeable acidity in soil.

Methodology, the development of this standard.

This standard specifies the potassium chloride extraction-titration method for the determination of exchangeable acidity in soil.

This standard applies to the determination of exchangeable acidity in acidic soils.

This standard is the first release.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Yingkou City Environmental Monitoring Center Station, Environmental Protection Institute of the Ministry of Environmental Protection.

This standard is verified by. Dalian Environmental Monitoring Center, Anshan Environmental Monitoring Center Station, Tieling Environmental Monitoring Center Station, Jinzhou City Environmental Monitoring Center Station, Panjin City Environmental Protection Station.

This standard was approved by the Ministry of Environmental Protection on June 3, 2013.

This standard has been implemented since September 1, 2013.

This standard is explained by the Ministry of Environmental Protection.

Determination of exchangeable acidity of soil - Potassium chloride extraction - titration

1 Scope of application

This standard specifies the potassium chloride extraction-titration method for determining the exchangeable acidity in soil.

This standard applies to the determination of exchangeable acidity in acidic soils.

When taking 5.00g sample and distilling to 250ml, the detection limit of the method is 0.10mmol/kg. The lower limit of the method is 0.40 mmol/kg.

2 Normative references

The contents of this standard refer to the terms in the following documents. For undated references, the valid version applies to this standard.

HJ 613 Determination of dry matter and moisture in soils - Gravimetric method HJ/T 166 Technical Specifications for Soil Environmental Monitoring

3 Terms and definitions

Exchangeable acidity exchangeable acidity the soil is extracted with a neutral salt solution, and the hydrogen ions and aluminum ions adsorbed on the soil colloid are exchanged to make a solution, and then Titration with a sodium hydroxide standard solution, the titration result is called exchangeable acidity.

4 Principle of the method

Extraction principle. repeatedly rinsing soil samples with appropriate potassium chloride solution, so that the exchangeable aluminum and exchangeable hydrogen on the soil colloid are separated by potassium.

The sub-exchanges form hydrogen ions and trivalent aluminum ions into the solution. The exchange process is expressed by the following formula.

$H-[soil\ colloid]-Al_3\ 3KCl[soil\ colloid]-3K\ Al_3\ 3Cl-H$ Determination of exchangeable acidity. After extracting the sample, take a part of the soil eluent and titrate directly with sodium hydroxide standard solution.

The result is exchangeable acidity.

Determination of exchangeable aluminum. After extracting the sample, take another part of the soil extract and add an appropriate amount of sodium fluoride solution to make the fluoride ion the aluminum ion forms a complex, Al_3 is fully complexed, and is titrated with a sodium hydroxide standard solution, and the result is exchangeable hydrogen.

Exchangeable the difference between acidity and exchangeable hydrogen is exchangeable aluminum.

5 Reagents and materials

Unless otherwise stated, analytically pure reagents in accordance with national standards were used for the analysis, and the experimental water was freshly boiled distilled water.

5.1 Freshly boiled distilled water

The distilled water is boiled and evaporated in a beaker (evaporation amount 10%), sealed and sealed, and sealed for use. It should be used now.

5.2 Hydrochloric acid solution. $c(\text{HCl}) = 1.0\text{mol/L}$

83 ml of concentrated hydrochloric acid ($\rho = 1.19\text{ g/ml}$) was diluted with water to 1 L.

5.3 Potassium chloride solution. $c(\text{KCl}) = 1.0\text{mol/L}$

Weigh 74.55g of potassium chloride, dissolve it in water, transfer it to a 1L volumetric flask, dilute to the mark with water, and mix.

5.4 Potassium hydrogen phthalate standard solution. $c(\text{C}_8\text{H}_5\text{KO}_4) = 0.01\text{mol/L}$

Weigh 0.5106g of potassium hydrogen phthalate, which has been dried by $105^\circ\text{C}\sim 110^\circ\text{C}$, dissolved in appropriate amount of water and transferred to 250ml.

In the volumetric flask, add water (5.1) to the mark and mix.

5.5 Sodium hydroxide standard solution. $c(\text{NaOH}) = 0.01\text{ mol/L}$

Weigh 0.4g of sodium hydroxide in an appropriate amount of water, and after the solution is cooled, transfer it to a 1L volumetric flask, dilute to the mark, mix and store.

In polyethylene plastic containers. Calibration was carried out using potassium hydrogen phthalate standard solution (5.4).

Calibration method. Pipette 25.00ml of hydrogen phthalate standard solution (5.4) into a beaker, put a stirrer in the beaker, insert when entering the electrode, titrate with sodium hydroxide solution (5.5). Until the pH reaches 7.80 ± 0.08 , it is stable for 30 seconds. At the same time, do a blank test.

The measurement was performed three times in succession, and the average value of the calibration results was taken three times.

The sodium hydroxide standard solution concentration is calculated according to formula (1).

1 VV

Vcc -

Where. c_1 - sodium hydroxide standard solution concentration, mol/L;

C_2 -- concentration of potassium hydrogen phthalate solution, mol/L;

V_0 -- blank test consumes the volume of sodium hydroxide solution, ml;

V_1 -- the volume of the sodium hydroxide solution consumed by the calibration, ml;

V_2 -- volume of potassium hydrogen phthalate solution, ml.