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

GB/T 16399-2021

Replacing GB/T 16399-1996

Methods for the chemical analysis of clay

黏土化学分析方法

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part

1. Structure and Drafting Rules of Standardization Documents" Drafting. This document replaces GB/T 16399-1996 "Clay Chemical Analysis Method", compared with GB/T 16399-1996, except for structural adjustment and In addition to editorial changes, the main technical changes are as follows:

- a) Deleted "General Provisions" and "Analytical Items" (see Chapter 2 and Chapter 3 of the.1996 edition);
- b) Added "normative references", "terms and definitions" and "basic requirements for tests" (see Chapter 2, Chapter 3 and Chapter 4);
- c) Changed "Sampling and sampling" (see Chapter 5, Chapter 4 of the.1996 edition);
- d) The method category is deleted (see 6.1, 7.1, 8.1, 9.1, 10.1, 11.1, 12.1, 13.1, 15.1 of the.1996 edition);
- e) The method of measuring loss on ignition has been changed (see 6.1, Chapter 6 of the.1996 edition);
- f) The determination method of silica has been changed (see 6.2, Chapter 7 of the.1996 edition);
- g) Change the indicator "xylenol orange indicator" in the zinc salt backdrop method (method A) to the "half-two" method for the determination of aluminum oxide Cresol orange indicator", the analysis procedure of the copper salt backdrop method (Method B) is modified (see Chapter 6.3, Chapter 8 of the.1996 edition);
- h) Change the "pH1.5~pH1.7" in the EDTA volumetric method (Method B) to "pH1.7~pH1.8" (see 6.4, Chapter 9 of the.1996 edition);
- i) The determination method of titanium dioxide has been changed (see 6.5, Chapter 10 of the.1996 edition);
- j) The method for determining calcium oxide-EDTA volumetric method (see 6.6, Chapter 11

of the.1996 edition) has been changed;

k) The determination method of magnesium oxide is changed-EDTA volumetric method (see 6.7, Chapter 12 of the.1996 edition);

1 Scope

China's national methods for the chemical analysis of clay - the determination of what a natural clay is actually made of, which decides what it can be used for. It specifies the basic requirements for the chemical analysis of clay components, the sample preparation and sampling, the chemical analysis methods, X-ray fluorescence spectrometry, inductively coupled plasma emission spectrometry and the tolerances on the measurement results, and it applies to the analysis of the chemical composition of natural clays. Clay is bought by the ceramic, refractory, cement, paper, drilling and foundry industries, and in every one of them the composition determines behaviour. The alumina-to-silica ratio sets the refractoriness. Iron and titanium set the fired colour, which is why a whiteware body tolerates only a fraction of a per cent of them. The alkalis act as fluxes and shift the firing range. Calcium and magnesium change the shrinkage and the maturing behaviour. Loss on ignition tells how much structural water and carbonate and organic matter will leave during firing, and therefore how much the piece will shrink. The document provides three routes to those numbers: the classical wet chemical methods, X-ray fluorescence and ICP emission spectrometry - the first slow but self-sufficient, the second fast and the standard choice for routine production control, the third suited to the minor and trace constituents. What matters as much as the procedures is the front of the document and the end of it: the sampling and preparation, because a clay is heterogeneous and an unrepresentative sample makes every subsequent digit meaningless, and the tolerances, which state how far two determinations of the same material may legitimately differ. Issued on 11 October 2021 and in force since 1 May 2022, it replaces GB/T 16399-1996.

This document specifies the basic requirements for chemical analysis methods of clay components, sample preparation and sampling, chemical analysis methods, X-ray fluorescence spectrometry, The tolerance of inductively coupled plasma emission spectrometry and measurement results. This document is applicable to the chemical composition analysis of natural clay.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations Only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to This document.

GB/T 6682 Analytical laboratory water specifications and test methods

GB/T 8170 Numerical rounding rules and the expression and determination of limit values

GB/T 15000 (all parts) Guidelines for the work of standard samples

JJF1343 General Principles and Statistical Principles for the Determining of Reference Materials

3 Terms and definitions

There are no terms and definitions that need to be defined in this document.

4.1 Verification and calibration

4.1.1 The balance used for chemical analysis should be accurate to 0.0001g. The balance or weight should be checked regularly.

4.1.2 The burette, volumetric flask, and pipette used in chemical analysis should be calibrated.

4.2 Expression of mass, volume, titer and result

4.2.1 The mass is expressed in grams (g) and is accurate to 0.0001g; the volume of the burette is expressed in milliliters (mL), and the reading is accurate to 0.01mL; The fixed degree is expressed in milligrams per milliliter (mg/mL).

4.2.2 The concentration, titer and volume ratio of the standard titration solution shall retain four significant figures.

4.2.3 Unless otherwise specified, all analysis results are calculated in terms of quality scores, and all analysis results are expressed as percentages (%) to the decimal point. Two people.

4.2.4 The rounding of values shall comply with the provisions of GB/T 8170.

4.3 Blank test Without adding the sample, perform the test in accordance with the same measurement procedure and use the same amount of reagent to correct the measurement results obtained.

4.4 Burning Put the filter paper and the precipitate in a pre-burned and constant crucible, in order to avoid flames, slowly dry and ash in an oxidizing atmosphere.