

ICS 77-010
CCS H 10

SN

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

SN/T 3011.1-2020

Replacing SN/T 3011.1-2011

**X-ray diffraction method to identify the phases of imported
solid wastes of metal minerals - Part 1: General rules**

X射线衍射法鉴别金属矿产类进口固体废物物相 第1部分：通则

(English Translation)

Issued on: August 27, 2020

Implemented on: March 1, 2021

Issued by: General Administration of Customs

Table of Contents

Foreword	
1 Scope	
2 Normative references	
3 Terms and definitions	
4 Method summary	
5 Apparatus and equipment	
6 Sampling and sample preparation	
7 Sample test	
7.1 Preparation of test pieces	
7.2 Determination	
7.3 Data analysis	
8 Result analysis	

Foreword

This part is the first part of the series of standards of SN/T 3011 "Identification of the Phases of Imported Solid Wastes of Metal Minerals by X-ray Diffraction Method".

This part was drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces SN/T 3011.1-2011 "Identification of Imported Solid Wastes of Metal Minerals by X-ray Diffraction Method Part 1: General then".

Compared with SN/T 3011.1-2011, the main technical changes in this part are as follows.

--Modified and added equipment;

--Added and improved the content of sampling and sample preparation;

--Improved the result analysis.

This part is proposed and managed by the General Administration of Customs of the People's Republic of China.

Drafting organizations of this section. Shenzhen Customs of the People's Republic of China, Shenzhen Institute of Inspection and Quarantine, and People's Republic of China City Customs/Shenzhen Vocational and Technical College.

1 Scope

This part of SN/T 3011 specifies the general rules for the identification of imported solid wastes of metal minerals by X-ray diffraction.

This part is applicable to the phase identification of imported solid wastes of metal minerals by X-ray diffraction method.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article. For undated reference documents, the latest version (including all amendments) is applicable to this document.

GB.2007.1 General Rules for Sampling and Sample Preparation of Bulk Mineral Products

3 Terms and definitions

The following terms and definitions apply to this document.

Loss of original use value or abandoned or abandoned although it has not lost the use value generated in production, life and other activities Solid, semi-solid, and gaseous articles and substances placed in containers, as well as articles that are included in solid waste management by laws and administrative regulations, substance.

Metal minerals

Through mining, beneficiation and smelting processes, one or more metal element or compound minerals can be extracted from it.

4 Method summary

The sample was tested with an X-ray diffractometer, and the interplanar spacing (d) and relative intensity (I) of the various diffraction peaks in the diffraction spectrum were compared with Compare the d value and I value of the standard minerals in the diffraction spectrum library to determine whether the sample contains a certain mineral or multiple minerals.

5 Apparatus and equipment

5.1

X-ray diffractometer. equipped with inorganic standard powder diffraction database and mineral standard powder diffraction database.

5.2

Grinding machine.

5.3

Agate mortar.

5.4

Standard sieve. 147 μm , 75 μm .

5.5

Blast drying oven. the temperature can reach 105 °C, and the temperature control accuracy is ± 2 °C.

Solid wastes

6 Sampling and sample preparation

Sampling and sample preparation are carried out in accordance with the provisions of GB.2007.1. All samples shall pass through a 147 μm standard sieve (5.4) and be kept at 105 °C ± 2 °C After drying for at least 2 hours, put it in a desiccator for later use.

7.1 Preparation of test pieces

Place the sample in an agate mortar (5.3) and grind until all of it passes through a 75 μm standard sieve (5.4), and take an appropriate amount of analysis sample and load it evenly in the sample frame, use a glass sheet to compress and flatten the powder to a plane with the surface of the sample frame.

7.2 Determination

Place the sample piece on the sample table of the X-ray diffractometer (5.1), and use appropriate measurement conditions to collect the X-ray diffraction pattern of the sample.

Refer to the X-ray diffractometer measurement conditions in Appendix A.

7.3 Data analysis

Use the processing program configured with the X-ray diffractometer to analyze the X-ray diffraction pattern obtained in 7.2 to obtain the crystal plane of the sample Spacing (d) and relative diffraction intensity (I/I_0). The relative deviation of d value measurement should be less than 1%.

Use Hanawalt qualitative phase analysis method or computer search qualitative phase analysis method to determine the phase composition of the sample. Hanawalt Qualitative refer to the figure B.1 in Appendix B for the determination procedure of the phase analysis

method, and refer to the figure in Appendix B for the determination procedure of the computer retrieval qualitative phase analysis method B.2.

Note: Phase analysis generally needs to determine the elemental composition information of the sample in advance. The technical means to determine the elemental composition include X-ray fluorescence spectroscopy, inductance Coupled plasma emission spectroscopy, etc.

8 Result analysis

8.1

If the main phase of the sample is a certain metallic mineral phase (that is, the strongest diffraction peak in the diffraction pattern of the sample is the strongest diffraction of a certain metallic mineral phase) Line), or contains other metal minerals, or contains a small amount of gangue phase, then the sample is determined to be the metal mineral.

8.2

If the main phase of the sample is a certain metallic mineral phase (that is, the strongest diffraction peak in the diffraction pattern of the sample is the strongest diffraction of a certain metallic mineral phase) Line), the non-mineral phase containing the metal or other metals is determined to contain the mineral phase of the metal and the non-mineral phase containing the metal Phase, or non-mineral phase containing other metals.

8.3

If a certain metal mineral phase does not exist in the phase composition of the sample (that is, the strongest diffraction peak in the diffraction pattern of the sample is not a certain metal mineral phase) the strongest diffraction line), or the non-mineral phase containing other metals, it is determined that the sample is not the metal mineral, or the non-mineral containing other metals Physical phase.

Appendix A

(Informative appendix) X-ray diffractometer measurement conditions Due to the different instruments used, the optimal analysis conditions may also be different, so it is impossible to give the general parameters of the X-ray diffractometer.

The set parameters should ensure the effective collection of the X-ray diffraction pattern of the sample. The parameters given in Table A.1 have been proved to be feasible.

Note: In the measurement process, it is recommended to use an anti-air scatter shovel to remove the air scatter background in the diffraction pattern.

Appendix B

(Informative appendix) X-ray diffraction qualitative phase analysis method B.1 Hanawalt method the most classic method of phase analysis is the Hanawalt method. The principle is to select three diffraction lines with the highest intensity from the diffraction lines of a