ICS 77.150
CCS H 66

# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA



# GB/T 11069-2017

Replacing GB/T 11069-2006

## High purity germanium dioxide

高纯二氧化锗

**Issued on: October 14, 2017** **Implemented on: May 1, 2018**

**Issued by: General Administration of Quality Supervision, Inspection and Quarantine;**
**Standardization Administration of the PRC**

# Table of Contents





## Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB/T 11069-2006 "high-purity germanium dioxide." This standard compared with GB/T 11069-2006, the main technical changes As follows:

--- Removed the scope of "optical fiber with germanium tetrachloride" purposes, and increased the "germane";

--- Revised normative references, an increase of GB/T 26074, GB/T 6284, delete GB/T 1551, GB/T 6609.25;

--- Increase GeO2-

05 Ca, Mg, Si, In, Zn element requirements;

--- "Burning reduction" revised as "volatile", and revised GeO2-06 requirements, increase GeO2-05 requirements;

--- Increase the water requirements;

--- Revised "granularity" requirement, "95%" changed to "97%";

--- Increase GeO2-05 germanium dioxide bulk density requirements;

--- Volatile, bulk density was revised to be measured according to Appendix A, Appendix B respectively;

5.2 batches 300kg adjusted to 100kg;

--- Remove the original Appendix A hydrogen reduction of high-purity germanium dioxide prepared germanium ingot reduction method, an increase of Appendix A high purity germanium dioxide play Determination of hair, Appendix B Determination of looseness of high purity germanium dioxide packing. This standard is proposed by China Nonferrous Metals Industry Association. This standard by the National Non-ferrous Metal Standardization Technical Committee (SAC/TC243) centralized. This standard was drafted unit. Nanjing, China Germanium Technology Co., Ltd., Yunnan Lincang Xin Yuan

Germanium Co., Hengyang Hengrong high-purity semi Conductor Material Co., Ltd. The main drafters of this standard. Liu Xinjun, Universal Kun, Chen Jianguo, Ke Zunbin. This standard replaces the standards previously issued as.

--- GB/T 11069-1989, GB/T 11069-2006. High-purity germanium dioxide

## 1 Scope

China's national standard for high purity germanium dioxide - the first stage of the germanium production chain and the form in which the element is refined and traded. Germanium is a minor metal with a large importance: it goes into infrared optics for thermal imaging, into the fibre used for optical communications where it raises the refractive index of the core, into polymerisation catalysts, and into the substrates and layers of high efficiency solar cells and high speed semiconductors. All of those uses depend on purity, and the purity is established here, at the oxide, before the metal is ever made. It specifies the requirements, the test methods, the inspection rules, and the marking, packaging, transport, storage and quality certificate for high purity germanium dioxide. It applies to the high purity germanium dioxide prepared from high purity germanium tetrachloride by hydrolysis, washing and drying, which is used mainly for the further production of germanium. The requirements are almost entirely about impurities: the germanium dioxide content, and then the limits on the individual metallic impurities, each specified separately because in a material of this purity a single element at a level of parts per million can determine whether the product is usable in optics or in a semiconductor. To those are added the physical requirements - the appearance and the particle size, which govern how the material behaves in the reduction furnace that follows - and the moisture. The test methods are the substance of the document, since measuring impurities at these levels is where the difficulty and the cost lie, and the quality certificate is what carries the analysis with the material. Issued on 14 October 2017 and in force since 1 May 2018, it replaces GB/T 11069-2006.



06 GeO2-

05 GeO2 purity of not less than 99.9999

99.999 Impurity content, not more than As 1.0 x 10 -5 5.0 x 10 -

## 2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version applies to this article Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 1480 metal powder dry screening method for the determination of particle size

GB/T 6284 chemical products - Determination of moisture in the general method of dry

weight loss method

GB/T 26074 germanium single crystal resistivity DC four probe measurement method YS/T

37.1 high purity germanium dioxide chemical analysis method mercury thiocyanate spectrophotometric determination of chlorine YS/T

37.2 High purity germanium dioxide chemical analysis method Molybdenum blue spectrophotometric method for the determination of silicon content YS/T

37.4 High purity germanium dioxide chemical analysis method Inductively coupled plasma mass spectrometry determination of magnesium, aluminum, cobalt, nickel, copper, zinc, Indium, lead, calcium, iron and arsenic

## 3 Requirements

3.1 product classification High purity germanium dioxide according to chemical composition is divided into two grades .GeO2-05, GeO2-06. Trademark indicated as. GeO2- Denoting germanium dioxide Said product purity, "0" Arabic numerals after the number of "9" in the mass fraction of germanium dioxide

3.2 chemical composition The chemical composition of high purity germanium dioxide should meet the requirements of Table 1. Table