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

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**High pure germanium tetrachloride
(English Translation)**

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1 Scope

This Standard specifies the requirements, test methods, inspection rules, marking, packaging, transportation, storage, quality certificate, and order (or contract) contents for high purity germanium tetrachloride.

This Standard applies to high purity germanium tetrachloride prepared from crude germanium tetrachloride through a purification process. The product is mainly used as a dopant for quartz optical fibers and in the preparation of high purity germanium dioxide.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 190, Packing symbol of dangerous goods

GB/T 602, Chemical reagent - Preparations of standard solutions for impurity

GB/T 6040, General rules for infrared analysis

GB 12463, General specifications for transport packages of dangerous goods

GB 20664, Limitation concentration of natural radioactivity in non-ferrous metal ores and concentrates products

UN, Recommendations on the Transport of Dangerous Goods. Model Regulations (Rev.16)

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

transmittance of infrared absorption of impurities

Transmittance of impurities in the infrared absorption spectrum of high-purity substances.

4.1 Classification

The products are classified into three designations according to purity. GeCl₄-08, GeCl₄-07 and GeCl₄-05.

4.2 Example of designation

The product designation is as follows.

4.3 Chemical composition

The chemical composition of the products shall comply with the requirements of Table 1.

Table 1 - Chemical composition

4.4 Transmittance of infrared absorption of impurities

"0" indicates high purity, and the Arabic numeral following "0" denotes the number of consecutive "9"s in the product purity percentage

Indicating germanium tetrachloride

The transmittance of infrared absorption of impurities of GeCl₄-08 and GeCl₄-07 products shall comply with the requirements of Table 2.

Table 2 - Transmittance of infrared absorption of impurities

4.5 Appearance quality

The product shall be a colorless and transparent liquid, and shall not contain any suspended matter or sediment.

4.6 Radioactivity

The product radioactivity shall comply with the provisions of GB 20664.

5 Test methods

5.1

The determination of the contents of the impurities copper, manganese, chromium, iron, cobalt, nickel, vanadium, zinc, lead, arsenic, magnesium, indium and aluminum in the product shall be carried out in accordance with the provisions of Appendix A.

5.2

The transmittance of infrared absorption of impurities in the product shall be determined in accordance with the provisions of Appendix B.

5.3

The appearance quality of the product shall be inspected visually.

5.4

The product radioactivity inspection shall be carried out in accordance with the provisions of GB 20664.

6.1 Inspection and acceptance

6.1.1

The products shall be inspected by the supplier's technical supervision department to ensure that the product quality meets the requirements of this Standard, and a product quality certificate shall be filled out.

6.1.2

The buyer may re-inspect the received products. If the re-inspection results do not conform to the provisions of this Standard, a re-inspection report shall be provided to the supplier in writing within 3 months from the date of receipt of the product, and the supplier and the buyer shall negotiate a solution.

6.2 Batch

Products shall be submitted for acceptance in batches, with each batch consisting of individually packaged products of the same designation. The specifications for individual packaging shall be determined through negotiation between the supplier and the buyer.

6.3 Inspection items

Each batch of products shall be tested for chemical composition, transmittance of infrared absorption of impurities, appearance quality, and radioactivity.

6.4 Sampling

Product sampling shall be carried out in accordance with the provisions of Table 3.

Table 3 - Sampling

6.5 Determination of test results

6.5.1

If the inspection results of chemical composition are unqualified, the batch of products shall be deemed unqualified.

6.5.2

If the test result of the transmittance of infrared absorption of impurities in the range of 4 000 cm⁻¹ ~ 1 000 cm⁻¹ is unqualified, double the number of samples shall be taken for repeated testing. If the repeated test results are still unsatisfactory, the batch of products shall be deemed unqualified.

6.5.3

If the inspection result of the appearance quality is unqualified, the batch of products shall be deemed unqualified.

6.5.4

If the inspection result of radioactivity is unqualified, the batch of products shall be deemed unqualified.

7 Marking, packaging, transportation, storage and quality

certificate

7.1 Marking

7.1.1

The outer packaging of the product shall be marked with "Waterproof", "Do Not Invert" (and "Fragile" if the packaging container is a glass or quartz bottle), product name, UN number, hazard class, packaging class and supplier name.

7.1.2

The packaging markings of the product shall comply with the relevant provisions of GB 190.

7.2 Packaging

The products shall be filled into special stainless-steel containers with treated internal surfaces. The net content of each bottle may be 50 kg, 100 kg, or 200 kg, or as agreed