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

GB/T 46609-2025

**Test method for neutron-gamma ray detection performance of
scintillation crystals**

闪烁晶体的中子-伽马射线探测性能测试方法

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the China Building Materials Federation. This document is under the jurisdiction of the National Technical Committee on Standardization of Artificial Lenses (SAC/TC461). This document was drafted by: Institute of High Energy Physics, Chinese Academy of Sciences; GRINM Rare Earth New Materials Co., Ltd.; and Beijing Sinoma Artificial Crystal Co., Ltd. Research Institute Co., Ltd., Shanghai Institute of Ceramics, Chinese Academy of Sciences, China Jiliang University, Beijing Glass Research Institute Co., Ltd., Nanhua University Southwest Institute of Technical Physics and CGN Beigu Technology Co., Ltd. The main drafters of this document are. Sun Xilei, Wang Cheng, Yu Jinqiu, Wang Haili, Wu Yuntao, Qin Laishun, Zang Xiaowei, Qu Guopu, Zhang Wei, and Gao Yongtao. Gao Aiqin. Neutron-gamma ray detection performance of scintillation crystals Test methods

1 Scope

GB/T 46609-2025 is the Chinese national standard covering measuring how well a scintillator tells a neutron from a gamma - the pulse shape discrimination and the figure of merit that quantifies the separation, the light yield and the energy resolution, and the sources and geometry used. Discrimination is what makes a detector usable for finding fissile material rather than just counting radiation. First edition, in force from 1 May 2026. Issued on 31 October 2025, it has been in force since 1 May 2026.

This document describes the testing methods for the neutron-gamma-ray detection performance of scintillation crystals. This document applies to testing the neutron-gamma-ray detection performance of scintillation crystals, as well as other scintillation materials such as scintillation ceramics, scintillation glasses, and composite scintillation bodies. The materials should be followed as referenced.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Among these, references with dates are... For this document, only the version corresponding to the specified date applies; for undated references, the latest version (including all amendments) applies. Used in this document.

GB 4075-2009 General requirements and classification of sealed radioactive sources

GB/T 4960.6-2008 Nuclear Science and Technology Terminology Part

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 On the surface of a scintillator (light guide), a cladding is used to effectively reflect light emitted in all directions from the scintillator (light guide) onto the outgoing direction.

[Source: GB/T 4960.6-2008, 2.3.11]

3.2 scintillation detector A nuclear radiation detector consists of a scintillator and a photoelectric sensor. The scintillator is typically coupled to the photoelectric sensor via an optical coupling material or a light guide. coupling. [Source: GB/T 4960.6-2008, 2.3.41, with modifications]

3.3 To ensure that the light emitted by the scintillator is effectively transmitted to the photoelectric sensor, a scintillator optical window and a photoelectric sensor incident window (scintillator optical window) are connected. The material added between the learning window and the light guide, and between the light guide and the photoelectric sensor entrance window. [Source: GB/T 4960.6-2008, 2.3.40, with modifications]

3.4 light guide An optical device used to transmit the scintillating light from the scintillator to the photoelectric sensor is placed between the scintillator and the photoelectric sensor. [Source: GB/T 4960.6-2008, 2.3.27, with modifications]

6 Nuclear Instruments

GB/T 13181-2024 Measurement Methods for the Performance of Solid-State Scintillators

GB 18871-2002 Basic Standards for Ionizing Radiation Protection and Radiation Source Safety