

ICS 17.240
CCS A 58



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

GB/T 16639-2008

Replacing GB/T 16639-1996

Standard method for use of an alanine - EPR dosimetry system

使用丙氨酸-EPR剂量测量系统的标准方法

(English Translation)

Issued on: September 19, 2008

Implemented on: August 1, 2009

Issued by: Standardization Administration of China

Table of Contents

Foreword
1 Scope
2 Normative references

Foreword

This standard is identical with ISO/ASTM51607:2004 "-EPR using alanine dosimetry systems with standard practice" (in English).

For ease of use, this standard made the following editorial changes.

- a) in accordance with Chinese custom to write some format has been modified.
- b) for ISO/ASTM51607. other international standards cited in 2004 have been adopted as the equivalent of a standard, this standard with References of these national standards or industry standards corresponding to international standards in place, the rest is not tantamount to the adoption of standard international standards, in this standard are a direct reference.

This standard replaces GB/T 16639-1996 "Radiation Processing -EPR alanine dosimetry system." this standard and GB/T 16639-1996 compared to the main changes are as follows.

- Standard name to "use -EPR alanine dosimetry system standard method";
- Radiation energy by the scope of " $\leq 30\text{MeV}$ " to " $0.1\text{MeV} \sim 28\text{MeV}$ " (1996 version of Chapter 1; this version 1.2.3);
- Redefined the standard "meaning and purpose", and added "4.3 Notes" content (the 1996 version of Chapter 4; Excerpts Chapter 4);
- Adjust the "dosimeters Preparation" chapter of the text content. The 1996 edition version 6.3.3 to 6.1 Note.
- In the "instrument" requirement adds to calibrate the instrument analytical balance technical requirements (1996 Version 7.1.3; Excerpts 7.1.2);
- Delete the words "establish the calibration curve," the technical requirements; and an increase in "8.1.4 Note 1", "8.1.4 Note 2" content (1996 Edition 8.5; Chapter 8 of this edition);
- Adjust the "EPR spectroscopy measurements" requirements; increased "9.1.5 Note",

gives three methods of EPR spectra were corrected;

--- Adjust the content of "Measurement Uncertainty" chapter; delete the contents of the 1996 version of 13.4 and 13.5.

The standard proposed by China National Nuclear Corporation.

This standard by the National Standardization Technical Committee of nuclear energy.

This standard was drafted. China Institute of Metrology.

1 Scope

1.1

standard specifies the use of alanine dosimetry system -EPR measured at photon and electron irradiation in the irradiated material absorbed dose Select the dosimeter material involved, namely the preparation of dose, dose measurement equipment and procedures. The system relies on electron paramagnetic resonance spectrometer Measurement of free radicals in alanine amino acid derivative. The system was designated as the reference standard level dosing system (see GB/T 16640).

1.2

This standard applies to the measurement of absorbed dose under the following conditions -EPR alanine dosimetry system.

1.2.1

absorbed dose range. 1Gy ~ 105Gy.

1.2.2

absorbed dose rate. $\leq 102 \text{ Gy} \cdot \text{s}^{-1}$ (continuous radiation field).

$\leq 5 \times 10^7 \text{ Gy} \cdot \text{s}^{-1}$ (pulsed radiation field) [1-3].

1.2.3

radiation energy range. 0.1MeV ~ 28MeV [1,2,4].

1.2.4

irradiation temperature range. -60 °C ~ 90 °C [2,5].

1.3

SI units are given in value as the standard value, the value in parentheses is for reference only.

1.4

This standard does not involve security issues associated with its use. Users of this standard is responsible for establishing the applicable safety and health standards and

make Before use to determine its limits applicable.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. For dated references, subsequent Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to the agreement are based on research Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard.

GB/T 16509 radiation processing dosimetry Uncertainty Evaluation Guidelines (GB/T 16509-2008, ISO/ASTM51707:2005, IDT) GB/T 16510 radiation absorbed dose calibration laboratory processing capacity requirements (GB/T 16510-2008, ISO/ASTM 51400:2002, IDT) Selection and calibration of the guide GB/T 16640 dosimetry systems for radiation processing is (GB/T 16640-2008, ISO/ASTM 51261:2002, IDT) ISO Guide to the Expression of Uncertainty in Measurement file ISO/ASTM51204 gamma irradiation facility for food processing Practical guide of dosimetry ISO/ASTM51431 electrons and bremsstrahlung irradiation facility for food processing dosimetry practice ASTM E170 radiation dose measurement and academic language ASTM E668 using thermoluminescence (TLD) dosimetry systems for electronic equipment to determine the absorbed dose of radiation damage test in practice ICRU Report No. 14 Radiation Dosimetry. the maximum photon energy 0.6MeV ~ 25MeV X-rays and gamma-rays ICRU Report No. 17 radiation dosimetry. a tube voltage of 5kV ~ 150kV X-ray generating means ICRU Report No. 34 pulse radiation dosimetry ICRU Report No. 35 of the initial energy of 1MeV ~ 50MeV electron beam radiation dosimetry ICRU Report No. 37 electrons and positrons stopping power ICRU Report No. 44 radiation dosimetry and measurement of tissue-equivalent ICRU Report No. 60 of ionizing radiation and the amount of the basic unit GB/T 16639-2008/ISO/ASTM51607:2004