HD-2001 | 低本底多道 γ 能谱仪
Low Background Multi-channel γ - ray Spectrometer

应用领域

- 建材、土壤、生物、地质样品等 γ 能谱测量分析
- 空气中、土壤中氡浓度的测量分析
- 建筑材料的快速无损检测
- 铀矿地质样品镭(铀)、钍、钾含量分析
- 可按用户要求配备铀、铯、钴、碘等人工核素分析软件

符合的标准/规程

- GB/T 11743-2013《土壤中放射性核素的 γ 能谱分析方法》
- GB 6566-2010《建筑材料放射性核素限量》
- GB 50325-2020《民用建筑工程室内环境污染控制标准》
- GB/T 18883-2022《室内空气质量标准》
- HJ 1212-2021《环境空气中氡的测量方法》

型式批准证书号：2011A206-11

Application Fields

- Gamma spectrometry analysis of building materials, soil, biological and geological samples
- Measurement and analysis of radon concentration in air and soil
- Rapid non-destructive dectection of building materials
- Content analysis of radium (uranium), thorium and potassium in uranium geological samples
- Provide analysis software of Ur, Ce, Co, I and other artificial nuclides, according to user's requirements.

The instrument meets the measuring principle and requirements of GB/T 11743-2013, GB 6566-2010, GB50325-2020, GB/T 18883-2022, and HJ 1212-2021.

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HD-2001 | 低本底多道 γ 能谱仪
Low Background Multi-channel γ - ray Spectrometer

仪器特点

- 目前国内唯一一款实际应用道数为2048道的NaI(TI)谱仪
- 具有粉末样品测量、无损样品测量、空气氡测量及土壤氡测量四大功能
- 全波采集，无脉冲漏计，具有基线修正、干扰识别等智能化功能，PMT输出信号直通，波形无畸变，将Cs峰放在测量范围的任意道址都能测得一致的分辨率
- 最高数据通过率：> 333 kcps，用于高活度放射性样品测量时，数据无漏计
- 可视化测量显示，具有信号波形、基线在线监测及测量结果实时分析等功能
- 具有峰位监测功能，保证数据采集质量
- 特征谱段综合分析解谱，全谱检验、多谱线对比等功能，可用于科研、教学及技术培训等
- 电动结构铅屏蔽室，更换样品省时省力

技术指标

1. 探测器：(φ75×75) mm的NaI (Tl) 晶体
2. 总道数：512、1024、2048、4096道任选
   实际应用道数：2048道
3. 能量分辨率：< 7.5% (^{137}Cs)
4. 本底：≤ 5.0 cps (50 keV ~ 3 MeV)
5. 微分非线性：< 0.05%
6. 积分非线性：< 0.10%
7. 稳定性：相对误差 ≤ 1.0% (24h)
8. 脉冲对分辨率：500ns
9. 检出限
   ^{226}Ra: 8.0 Bq/kg
   ^{232}Th: 6.0 Bq/kg
   ^{40}K：20.0 Bq/kg
   ^{222}Rn (空气): 6.0 Bq/m^3
   ^{222}Rn (土壤): 300.0 Bq/m^3
10. 最高数据通过率：> 333 kcps
11. 测量不确定度：< 10%(核素放射性活度 > 37 Bq/kg)
12. 使用环境
    温　　度：(+5 ~ +40)°C
    相对湿度：≤ 90%
13. 电源：220V±10%, 50Hz
14. 外形尺寸和重量
    铅屏蔽室：(φ580×850) mm
    壁厚100 mm　约900 kg

所获荣誉

2007年荣获国防科工委及中核集团公司科技进步二等奖

仪器认证

中国计量科学研究院检定并出具检定证书

型式批准证书号：2011A206-11

Instrument Characteristics

- The practical application channels are 2048, which is the only type of multi-channel Gamma Spectrometer in domestic at present.
- With four functions of powder sample measurement, non-destructive sample measurement, air radon measurement, soil radon measurement.
- Instrument uses Full-wave acquisition, and does not have apulse missing. It has the intelligent functions of baseline correction, interference identification and so on. Instrument receives PMT output signal directly, and does not have waveform distortion. It can get consistent resolution when Cs peak is put any channel within measurement range.
- The maximum data passing rate: > 333 kcps. It can be used to measure high activity radioactive samples without data missing.
- With the functions of visual display measurement, signal waveform, baseline online monitoring directly, real-time analysis of measurement results;
- Peak monitoring ensure the quality of acquisition data.
- Comprehensive analysis and solution of characteristic spectrum, full spectrum testing;
- With function of multi-line comparison, it can be used for research, teaching and technical training, etc.
- Using electric structure lead shielded room, it is time-saving when changing samples.

Specifications

1. Detector: φ75mm×75mm NaI Crystal
2. Total Channels: 512、1024、2048 or 4096 alternative, the practical application channel is 2048
3. Energy Resolution: < 7.5% (^{137}Cs)
4. Background: ≤ 4.5 cps (50 keV – 3 MeV)
5. Differential Nonlinearity: < 0.05%
6. Integral Nonlinearity: < 0.10%
7. Stability: RE ≤ 1.0% (24h)
8. Pulses Resolution: 500ns
9. Detection Limit:
   ^{226}Ra: 8.0 Bq/kg
   ^{232}Th: 6.0 Bq/kg
   ^{40}K: 20.0 Bq/kg
   ^{222}Rn(air): 4.0 Bq/m^3
   ^{222}Rn(soil): 300.0 Bq/m^3
10. The Maximum Data Pass Rate: > 333 kcps
11. Measurement Uncertainty: < 10% (Radionuclide Activity > 37 Bq/kg)
12. Operating Environment
    Temperature: (+5 – +40)°C
    Relative Humidity: ≤ 90%
13. Power: 220V±10% , 50Hz
14. Dimension and Weight
    Lead-shielded Chamber: (φ580×850) mm
    Thickness: 100 mm, weight about 900 kg

Received Honorary

The instrument won the second prize for scientific and technological progress by COSTIND and China National Nuclear Corporation in 2007.

Instrument Certification

Verified by National Institute of Metrology P.R.China (NIM) and issued the verification certificate.

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