Gamma-Radiation CdZnTe Microspectrometer

Main Features

- Very compact
- Replaceable CdZnTe detector modules
- High energy resolution and efficiency
- High count rate capability
- USB powered
- Easy-to-use

Main Applications

- Gamma-radiation spectroscopy
- Environmental monitoring
- Nuclear power plants
- Nuclear material flow monitoring
- Home land security
- Unmanned aerial vehicle

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NUCLEAR RADIATION
SEMICONDUCTOR DETECTORS
AND ASSOCIATED ELECTRONICS

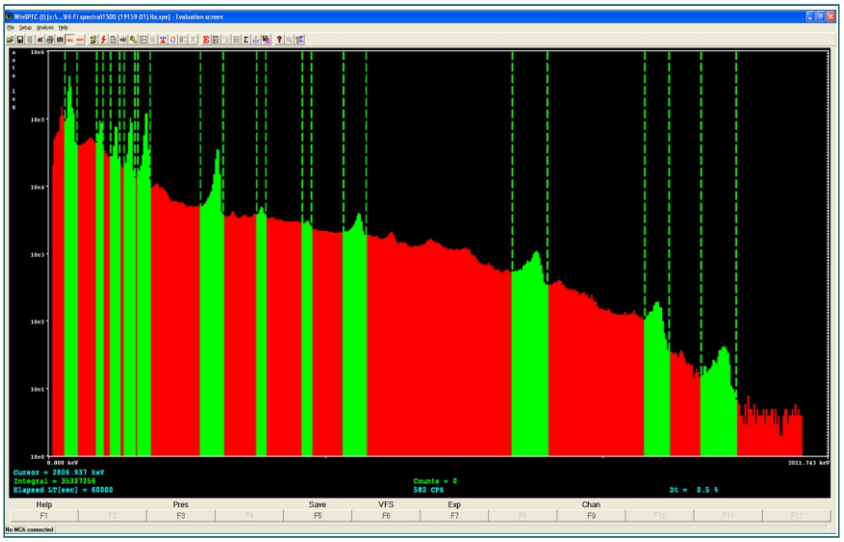
Gamma-Radiation CdZnTe Micro Spectrometer with exchangeable detector modules

Gamma-Radiation CdZnTe Micro Spectrometer is a high performance device based on application of room temperature operating CdZnTe semiconductor detectors and a very small and low consuming digital multichannel analyzer (MCA) MicroMCA527 (GBS-Elektronik GmbH). The microspectrometer allows measuring gamma-radiation spectra and storing it for processing in a PC through the USB port. It is a self-sufficient device and consists of two modules - a base MCA module µSPEC/µSPEC+ and a replaceable detector module. The base module contains an amplifier, a digital signal processor, a high voltage power supply of the detector, a low voltage power supply and computer interface. Exchangeable detector modules contain a charge sensitive preamplifier and a high quality CdZnTe detector. There are detector modules with different CZT detector volumes from 5 mm³ to 1600 mm³.
The microspectrometer is communicated and powered by a PC via USB port. It is made to operate under control of MS Windows based GBS MCA166/MCA527 WinSPEC free of charge software.

Specifications

- Detector type — CdZnTe quasi-himispherical
- Detector volume:
  - µSPEC60 — 60 mm³
    with detector module DM60
  - µSPEC500 — 500 mm³
    with detector module DM500
  - µSPEC1500 — 1600 mm³
    with detector module DM1500
  - µSPEC310/XX/A — from 1 mm³ to 60 mm³
    with detector module DM310/XX/A*
  - µSPEC500/A — 500 mm³
    with detector module DM500/A
  - µSPEC1500/A — 1600 mm³
    with detector module DM1500/A
- Energy range — 20 keV to 3.0 MeV
- Energy resolution (FWHM) at 662 keV@25°C:
  - µSPEC60 — <2%
  - µSPEC500 — <2%
  - µSPEC1500 — <3%
  - µSPEC310/XX/A:
    - for detectors volume 1mm³…20 mm³ — <1.5%
    - for detectors volume 60 mm³ — <2%
  - µSPEC500/A — <2%
  - µSPEC1500/A — <3%
- Maximal throughput — >100 kcps
- Number of channels:
  - with base MCA module µSPEC — up to 4k
  - with base MCA module µSPEC+ — up to 16k
- Shaping time:
  - µSPEC — 0.1 µs to 2 µs, step 0.1
  - µSPEC+ — 0.1 µs to 25.5 µs, step 0.1
- Flat top time — 0 µs to 15 µs, step 0.1
- Power supply — USB, 4.5 V…5.2 V, 100 mA max
- Dimensions — 25 mm × 25 mm × 72 mm
  without removable probe
- Connecting cable length — up to 20 m
  µSPEC310/XX/A, µSPEC500A, µSPEC1500A
- Weight:
  - µSPEC60 — 60 gram
  - µSPEC500 — 65 gram
  - µSPEC1500 — 70 gram
  - µSPEC310/XX/A with 20 cm cable — 100 gram
  - µSPEC500A with 20 cm cable — 140 gram
  - µSPEC1500A with 20 cm cable — 160 gram
- Operation temperature range — 5°C … 50°C
- Humidity — ≤90%, non condensing
- IP protection class — IP40

Microspectrometer µSPEC60/500/1500



Spectrum of ^{226}Ra measured by µSPEC1500
User interface of the WinSPEC software

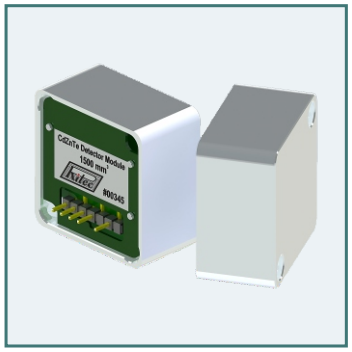
Microspectrometer's components and accessories (can be ordered separately)

Base Modules µSPEC / µSPEC+

Base Module

- Number of channels:
  - µSPEC — up to 2k
  - µSPEC+ — up to 16k
- External dimensions: 25 mm x 25 mm x 58 mm

Detector Modules DM60 / DM500 / DM1500



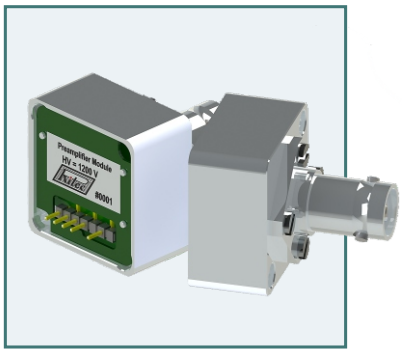
- Detector volume:
  - DM60 — 60 mm³
  - DM500 — 500 mm³
  - DM1500 — 1600 mm³
- External dimensions: 25 mm x 25 mm x 13 mm

Detector Modules DM500/A, DM1500/A

- Detector volume:
  - DM500/A — 500 mm³
  - DM1500/A — 1600 mm³
- Removable probe dimensions:
  - DM500/A — Ø28 mm x 58 mm
  - DM1500/A — Ø32 mm x 58 mm
- Connecting cable length — up to 20 m

Detector Modules DM310/XX/A

- Detector volume:
  - DM310/01/A — 1 mm³
  - DM310/05/A — 5 mm³
  - DM310/20/A — 20 mm³
  - DM310/60/A — 60 mm³
- Removable probe dimensions: Ø8 mm x 82 mm
- Connecting cable length — up to 20 m



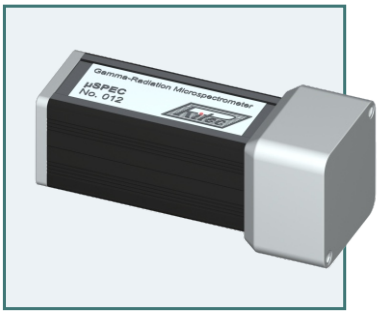
Preamplifier Module PM120

- Noise — ≤ 2.5 keV
- Charge sensitive, based on CdZnTe equivalent: — ≥ 80 mV/MeV
- Integral nonlinearity (60 keV – 1.33 MeV): — ≤ 0.1 %
- Available preset bias voltage: — from +100 V to +2000 V
- Bias filtering: — Yes
- Input connector: — BNC
- External dimensions (without connector): — 25 mm x 25 mm x 13 mm

The module is designed for application with CZT detectors type CZT500(S) or similar.

Gamma-Radiation CdZnTe Micro Spectrometer µSPEC4000 with Large Volume CdZnTe Detector

New!



µSPEC4000

· Detector type:	CdZnTe quasi-hemispherical
· Detector volume:	4000 mm³
· Energy range:	20 keV to 3.0 MeV
· Energy resolution (FWHM) at 662 keV:	<4%
· External dimensions:	35 mm x 35 mm x 77 mm
· Weight (maximal)	100 gram

Other parameters are the same as for µSPEC60/500/1500

Clustered high efficiency gamma-radiation spectrometers MultiSPEC2000 and MultiSPEC6000

Clustered high efficiency gamma-radiation spectrometers MultiSPEC are based on application of the serial microspectrometers. It is an assembly of 4 serial microspectrometers combined by a special holder. All microspectrometers work in parallel, creating one common spectrum. For the collection and processing of the obtained spectra a special MS Windows based GBS software WinSPECx16 is used. Clustered spectrometer is communicated and powered by a PC via USB port. Spectrometers holder can be mounted on a mini tripod.

MultiSPEC2000 / MultiSPEC6000

New!

· Total detector volume:	
MultiSPEC2000	2000 mm³ (4 x µSPEC500)
MultiSPEC6000	6400 mm³ (4 x µSPEC1500)
· Energy resolution (FWHM) at 662 keV:	
MultiSPEC2000	<2.5%
MultiSPEC6000	<3%
· Power supply	USB, 4.5 V….5.25 V, 400 mA max
· Connector	micro USB, B type
· Dimensions *without USB cable and tripod*	66 mm x 75 mm x 88 m
· Weight with 4 x µSPEC500 *without USB cable and tripod*	520 gram

Accessories

Microspectrometer holder with mini tripod

Waterproof microspectrometer holder IP67 protection class with mini tripod and waterproof USB cable

Holder for clustered microspectrometer with USB hub

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