SCIENTIFIC INSTRUMENTS

Portable X-Ray Fluorescence Spectrometer **X-SPEC**

Scientific Instruments CJSC presents a line of analytical instruments: X-SPEC portable XRF spectrometers designed for qualitative, semi-quantitative and quantitative analysis of solid, liquid and powder materials. Elements detection ranges from Na to U.

Most important characteristics of the new line of portable instruments are high analytical performance and the possibility to operate outside the laboratory: in the field, at factories, at construction sites, etc.

The following spectrometer modifications are provided:

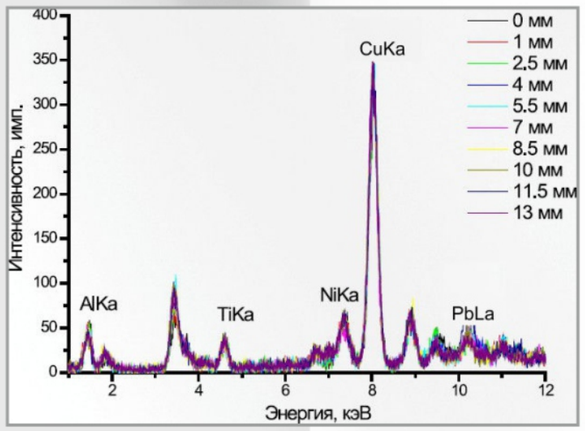
- **X-SPEC-40L** – the instrument is specially designed for light elements detection: a tube with the power 4W, the voltage 40 kV and the Ag tube target; a set of primary filters; SDD detector active area 25 mm^2. He purging;
- **X-SPEC-50L** - designed for low content light elements detection: a tube with the power 10W, the voltage 50 kV and the Ag or Ta target; a set of primary filters; SDD detector active area 25 mm^2. He purging;
- **X-SPEC-40H** – a multipurpose instrument: a tube with the power 4W, the voltage 40 kV and the W or Rh target; a set of primary filters; Si-Pin detector active area 7 mm^2;
- **X-SPEC-50H** - designed for low content elements detection: a tube with the power 10W, the voltage 50 kV and the W or Rh target; a set of primary filters; Si-Pin detector active area 7 mm^2.

SDD detector energy resolution is up to 130 eV on the MnKα line.

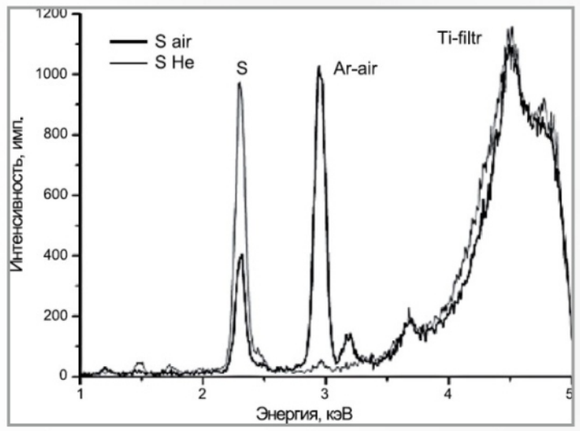
All models can be made in dust- and waterproof metal case and can be installed on a conveyor.

A portable analyzer capable of precise noncontact measurements!

X-ray optics of all analyzer modifications employ the inversion probes geometry, which allows significant reduction of the influence of both variations in the distance between the sample and the detector rought samples and on the elements detection results.



Spectra of an aluminum alloy specimen measured at various distances between the detection head and the sample (X-SPEC-40H)



Spectra of a boric acid specimen with the sulphur of 1% measured in the air and with He purging (X-SPEC-40L).

In the field, the X-SPEC is operated with a pocket PC connected to the analyzer via wireless Bluetooth connection. In the laboratory, handling and processing the spectrum data can be carried out with a stationary PC via the USB connection.

Base analyzer modification includes:

- Spectrometer;
- Pocket PC;
- Rechargeable batteries and the batteries charger;
- A kit of spare tools and accessories;
- A practical shoulder strap bag;
- A shock-proof case.

The device delivery set can also include:

- A compact tripod for work in a laboratory;
- A video camera for filming the object under test;
- A set for preparation of granular and solid samples;
- An extensible pole for analysis of hard-to-reach objects;
- 2-liter helium bulb for light elements detection;
- Certified analysis methods.

User-friendly interface.

The software operates in two modes: survey mode and analysis mode.

Extensible software provides a lot of possibilities for sophisticated customers!

Features:

- Regression methods: linear regression method, Lucas-Tooth, Cleiss-Quintin and Lachance-Traill models including models with alpha-correction;
- Fundamental parameters analysis (both standardless analysis and analysis with certified samples);
- Additional automatic procession modules can be added to the software for solving specific problems: specific analysis techniques, identification, sorting, grading, etc.

X-SPEC M integration into a measurement system.

The Technolink company together with engineers of the Scientific Instruments company have created a system on the base of the portable X-ray fluorescence spectrometer X-SPEC M for measuring concentrations of metals in heap leaching. This system is currently being used at Nadezhdinsky metallurgy plant in Norilsk, RF.

The system provides analytical information for the process team to be able to control hydrometallurgical processes. The data provided are element concentrations (nickel 0.01 - 1.5 g/l and iron 20 - 50 g/l) in controlled solutions. The data are provided at required intervals (not more than 5 minutes). Use of the system allows reducing loss of nonferrous metals.

The system operates 24/7. The diagnostics of the technical facilities of the system is carried out automatically.

This publication is authorized by Technolink CJSC.

We develop and provide analysis methodologies.

The following certified methodologies are provided:

- Determination of concentration of elements in aluminum deformable alloys using x-ray spectrometry analysis. Procedure of measurements MVI RF-001-2010. Certificate No. 242/10-2010;
- Determination of concentration of elements in cast aluminum alloys using x-ray spectrometry analysis. Procedure of measurements MVI RF-002-2010. Certificate No. 242/10-2010;
- Determination of concentration of elements in copper-zinc alloys using x-ray spectrometry analysis. Procedure of measurements MVI RF-003-2010. Certificate No. 242/11-2010;
- Determination of concentration of elements in leaded brass specimens using x-ray spectrometry analysis. Procedure of measurements MVI RF-004-2010. Certificate No. 242/12-2010;
- Determination of concentration of elements in alloy steel specimens using x-ray spectrometry analysis. Procedure of measurements MVI RF-005-2010. Certificate No. 242/13-2010;
- Determination of concentration of elements in titanium alloys using x-ray spectrometry analysis. Procedure of measurements MVI RF-006-2010. Certificate No. 242/14-2010;
- Determination of concentration of elements in jewellery alloys using x-ray spectrometry analysis. Procedure of measurements MVI RF-007-2010. Certificate No. 242/15-2010.

We guarantee prompt replacement of failed spectrometer parts and timely maintenance of the device.

Characteristics of portable X-SPEC analyzers

X-ray tube target	Ag, Ta, W or Rh
Maximum x-ray tube voltage, kV	40, 50
Maximum x-ray tube power, W	4, 10
Detector type	Silicon Drift Detector (SDD) or Si-Pin
Channels number	4096
Energy resolution at the MnKα line, eV	< 150
Element detection limits, ppm*	Cr-20, Mn-16, Fe-14, Cu-11, Pb-14, Zn-11
Stability (RMSE)	1%
Dimensions, mm	295 x 295 x 92
Weight, kg	< 2
Light elements detection is possible with He purging for L series instruments	

*- elements detection limit determined for an aluminum alloy reference sample 1914. X-ray tube operation mode: 25 kV, 100 mA. The Ti filter allows lowering detection limits by a factor of 1.5 and more.

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