SinerX

Modular software for qualitative and quantitative analysis of X-Ray spectra

Sinerlab Srl
Via Trento 12 – 51039 – Quarrata (PT) – P.IVA 01613380474
Tel. 0573 1935280 Fax 05731936000
Email: info@sinerlab.it -www.sinerlab.it

X-ray fluorescence (XRF) is the emission of characteristic "secondary" (or fluorescent) X-rays by a material that has been excited through bombardment with high-energy X-rays or gamma rays. When an atom is exposed to radiation with energy exceeding its ionization potential, usually in the keV range, it can absorb an incident photon and expel tightly-bound electrons from the inner orbitals. The removal of an electron in this way makes the electronic structure of the atom unstable, and electrons from the outer orbitals "fall" inward to fill the hole left behind. In this process, energy is released in the form of photons with energy equal to the energy difference between the two orbitals involved. Thus, the material emits radiation with an energy that depends on its composition.

The phenomenon can be used for elemental analysis based on theoretical knowledge of the X-Ray fluorescence phenomenon. The method adopted is the so called "Fundamental Parameters" method.

SinerX is a modular software for X-Ray spectra acquisition and processing that allows the following operations:

MODULE 1

Spectra acquisition and display: SinerX can be interfaced to multichannel analyzers (eg. Amptek's PX4, MCA800A) in order to set the acquisition configuration and manage the data recording. SinerX also allows to display the recorded data and compare spectra from different acquisition sessions.

MODULE 2

Qualitative analysis: SinerX performs an automatic analysis of the spectrum by locating the peaks of the characteristic energies and thus providing the identification of the element present in the sample.

MODULE 3

Quantitative analysis: SinerX provides the elemental composition of the analyzed sample by using an iterative "Fundamental Parameters" method.

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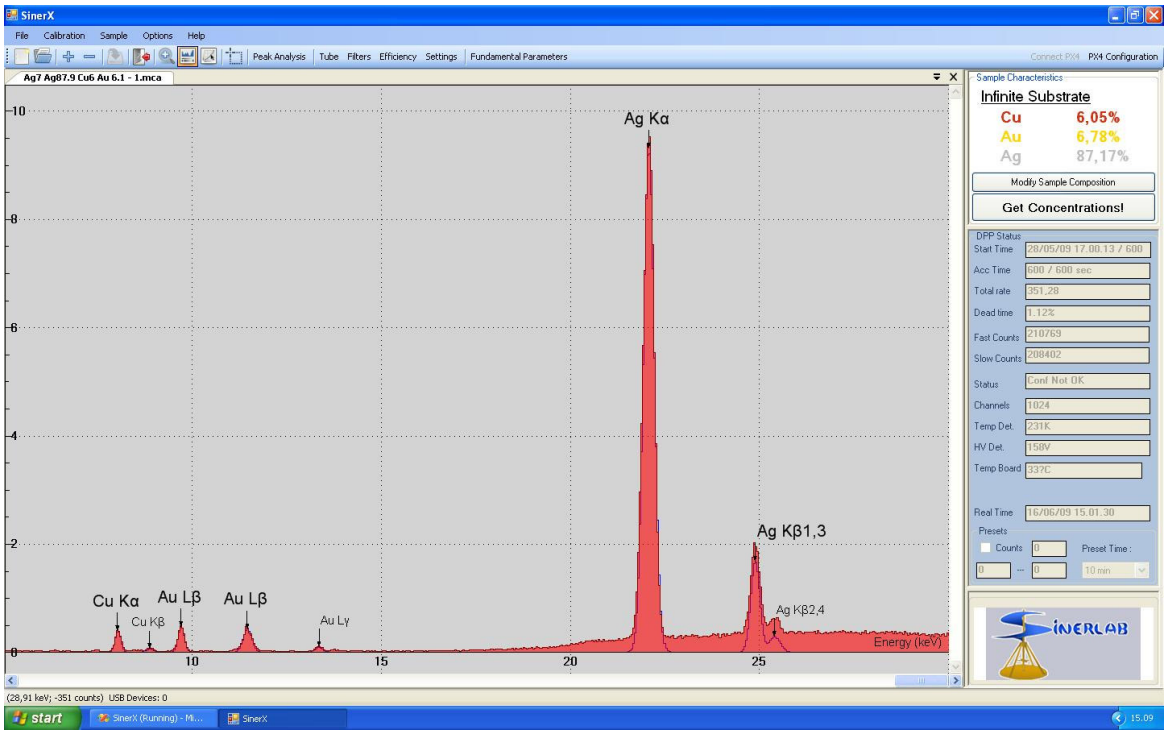
MODULE 1: Spectra acquisition and display

SinerX can be connected to multichannel analyzers (e.g. Amptek's PX4, MCA8000A) in order to set their configurations and manage the data acquisition process. The spectra are presented as they are recorded and a graphical comparison with spectra obtained from other measurement sessions is possible. The output data are stored in ".mca" format, thus being fully compatibile with Amptek.



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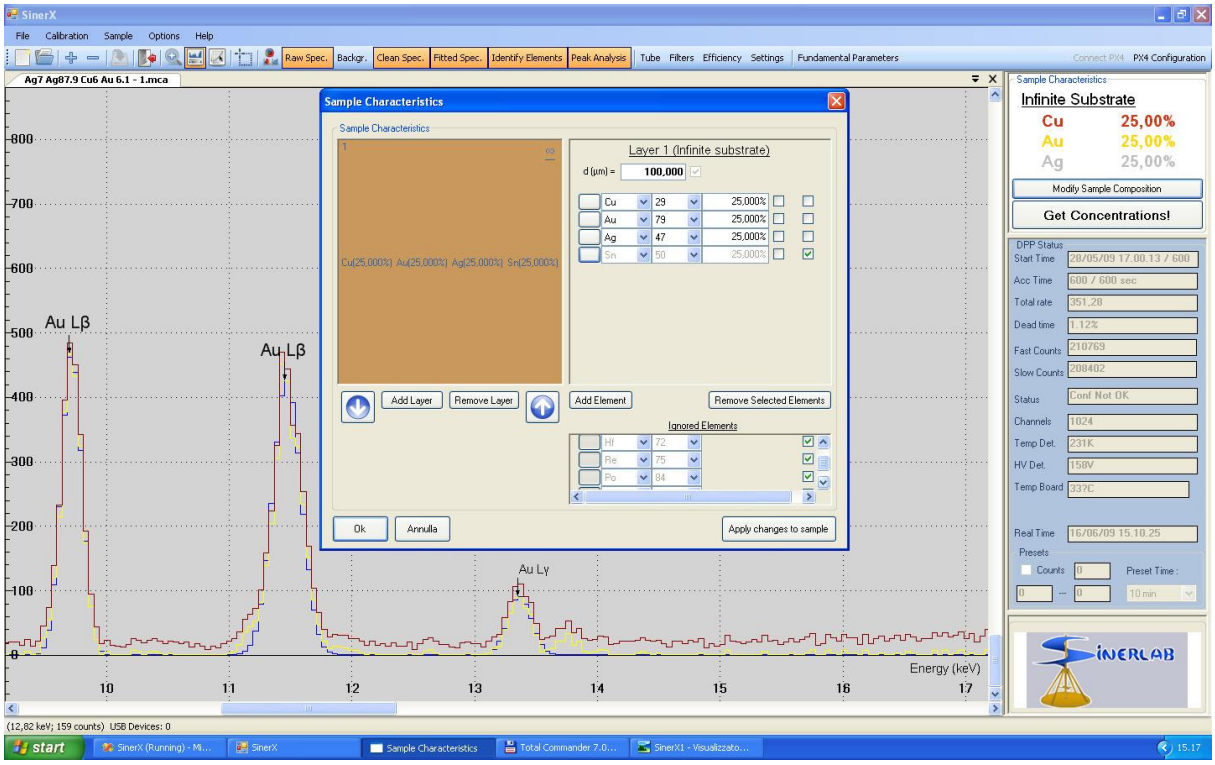
MODULE 2: Qualitative Analysis

SinerX performs an automatic analysis of the spectrum by locating the peaks of the characteristic energies, therefore providing the identification of the elements in the sample.
The picture below shows the graphical interface for the qualitative analysis, available also in an automatic mode. Nevertheless, the user can freely refine the elemental analysis by adding elements that they are sure or presume to be present in the sample.



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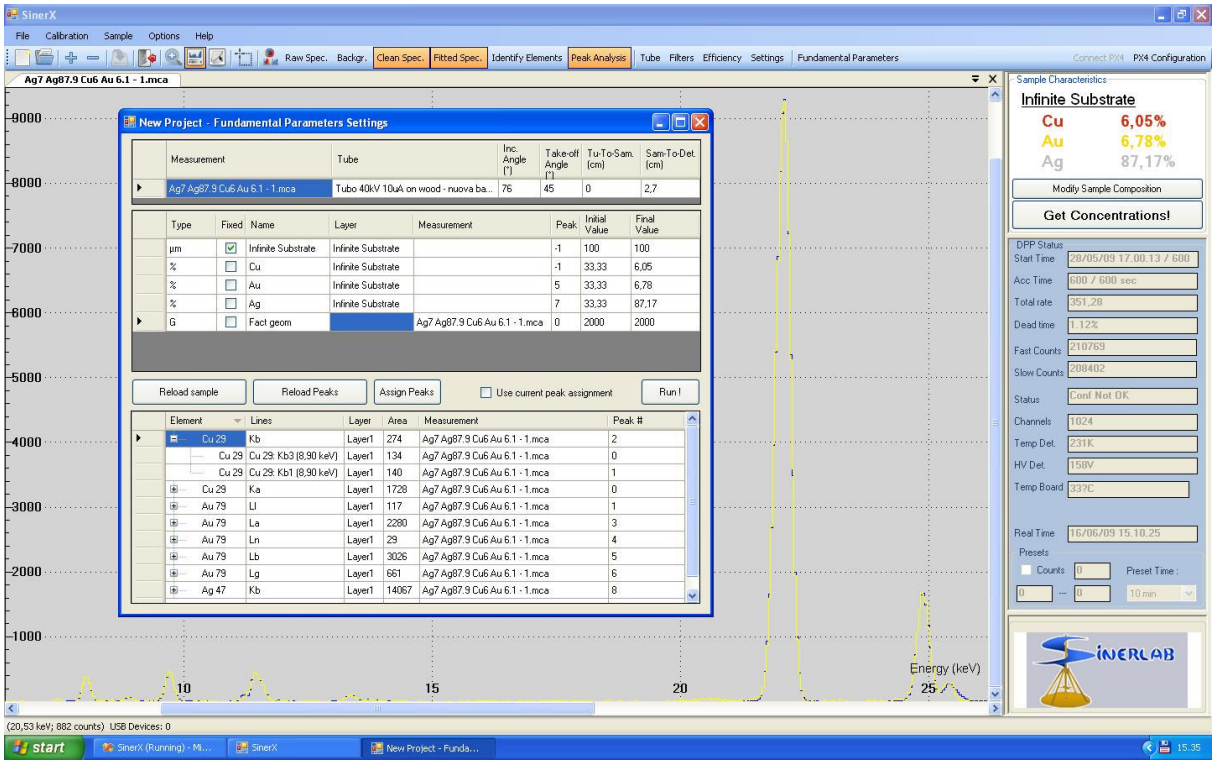
MODULE 3: Quantitative Analysis

SinerX provides the elemental composition of the analyzed sample by using an iterative "Fundamental Parameters" method.

The picture below shows the graphical interface for the quantitative analysis, that can be either run in an automatic fashion or, in the case of advanced users, in a semi-automatic manner by manually setting any input quantity employed (e.g. peak areas, excitation spectrum, etc).



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Features

Module 1

- Data acquisition and spectra management
- Graphical comparison of multiple measured spectra
- Recording of spectra in ".mca" format (Amptek compatible)

Module 2

All the features of module 1 with the addition of:

- Background subtraction
- Qualitative analysis of the recorded spectra and automatic elemental identification
- Manual fine-tuning of the qualitative analysis for very low concentration elements

Module 3

All the features of module 2 with the addition of:

- Concentration of the elements in the sample, obtained by means of an automatic quantitative analysis using the fundamental parameters method
- Fully manual fine-tuning of the analysis for further improvement of the accuracy of the results

Computer requirements

	Minimal	Recommended
CPU	Dual Core 2.0 GHz	Dual Core 3.4 GHz
RAM	2 Gb	2Gb
OS	Windows XP, Vista	Windows XP, Vista

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