

How to interpret X-rays from a spectrometer



Article Overview

X-ray spectra reveal the elemental composition, chemical states, and structural information of a material by analyzing the energies and intensities of emitted or absorbed X-rays.

Understanding the Basics

X-ray spectrometry works by bombarding a sample with X-rays, which excites atoms and causes them to emit secondary X-rays or eject electrons. The energies of these emissions are characteristic of specific elements and their chemical environments, allowing identification and quantification of elements in the sample .

- Energy-Dispersive X-ray Spectroscopy (EDS/EDX): Measures the energy of incoming X-ray photons using a semiconductor detector. Peaks in the spectrum correspond to specific elements, with peak height roughly proportional to concentration .
- Wavelength-Dispersive X-ray Spectroscopy (WDS): Uses a crystal to diffract X-rays according to Bragg's law. By scanning one peak at a time, WDS provides higher resolution and more precise quantification, especially for trace elements .

Interpreting XPS Spectra

In X-ray Photoelectron Spectroscopy (XPS), X-rays eject electrons from the sample. The binding energy of these electrons is calculated from the known photon energy and measured kinetic energy. Peaks in the XPS spectrum indicate:...

Article Content

Jul 20, 2026

12.2: Interpreting Mass Spectra

You might wish to refer to the table of bond dissociation energies when attempting problems involving the interpretation of mass

Apr 25, 2026

X-Ray Spectra

EDX, or energy-dispersive X-ray spectroscopy, is defined as an analytical technique used for elemental analysis or chemical

May 22, 2026

2. Interpretation of XRF Spectra

Interpretation of XRF Spectra is shared under a CC BY-NC-SA 4.0 license and was authored, remixed, and/or curated by Contributor

Jul 05, 2026

X-Ray Spectroscopy Analysis: Techniques and Applications Across

X-ray spectroscopic and diffractometric techniques have continued to advance rapidly across the period from

Dec 13, 2025

Chapter 16: X-ray Spectroscopy

As may be seen from this short review of the development of X-ray spectroscopy it was early recognized that X-rays are emitted by the

Jan 17, 2026

Practical guides for x-ray photoelectron spectroscopy (XPS ...

The carbon 1s photoelectron spectrum is the most widely fit and analyzed narrow scan in the x-ray photoelectron

Nov 29, 2025

A review of the handheld X-ray fluorescence spectrometer as a tool for ...

The lid of the compartment is then closed, allowing for containment of any errant X-rays that do not make it to the

Jul 20, 2026

X Ray Spectroscopy

X-ray absorption spectroscopy (XAS) is defined as a technique that utilizes synchrotron radiation X-rays to investigate

Jul 29, 2025

How does XRF Work?

A wavelength-dispersive spectrometer treats the X-rays as waves and uses some regular structure (gratings or crystals) to cause

Dec 17, 2025

X-Ray Photoelectron Spectroscopy (XPS; aka Electron Spectroscopy

Educational content page detailing X-ray photoelectron spectroscopy (XPS/ESCA), covering instrumentation,

Aug 31, 2025

Energy-dispersive X-ray spectroscopy

EDS spectrum of the mineral crust of the vent shrimp *Rimicaris exoculata*. Most of these peaks are X-rays emitted when electrons

Mar 11, 2026

X-ray Photoelectron Spectroscopy (XPS)

How XPS works X-rays (photons) are shot onto a sample, and when electrons in the sample absorb enough energy, they are ejected

May 21, 2026

XRD Basics

In its most simplified form, a generic X-ray scattering measurement is shown below. A beam of X-rays is directed

Aug 23, 2025

X-ray photoelectron spectroscopy

X-ray photoelectron spectroscopy (XPS) is a surface-sensitive quantitative spectroscopic technique that

Feb 05, 2026

What Is X-Ray Spectroscopy?

X-ray spectroscopy is used across several areas of science and technology to better understand the atomic

Nov 18, 2025

X-ray spectroscopy

In a wavelength-dispersive X-ray spectrometer, a single crystal diffracts the photons according to Bragg's

Jan 29, 2026

X Ray Spectroscopy

X-ray astronomical spectroscopy consists of measuring the spectrum of the X-rays emitted by a source in space. By

Feb 28, 2026

Avoiding common errors in X-ray photoelectron spectroscopy data ...

Abstract Despite numerous tutorials and standards written to the technical community on X-ray photoelectron

Jun 05, 2026

X-Ray Spectroscopy

The energy of emitted X-rays is not same for all elements. It is different because the energy levels of atoms are

Jun 11, 2026

X-ray Spectroscopy

X-ray Spectroscopy is a broadly used method to investigate atomic local structure as well as electronic states. Very generally, an X

Dec 15, 2025

Photoelectron spectroscopy (article) | Khan Academy

Photoelectron spectrometers work by ionizing samples using high-energy radiation (such as UV or x-rays) and then measuring the

Jan 27, 2026

8.6: Atomic Spectra and X-rays

Consider X-rays incident on the surface of a crystalline solid. Some X-ray photons reflect at the surface, and others

Nov 06, 2025

X-Ray Spectroscopy: Techniques and Applications Explained

Together, these techniques leverage X-rays' inner-shell probing power, offering complementary views – from surface

Sep 28, 2025

Tutorial on Powder X-ray Diffraction for Characterizing Nanoscale ...

This Editorial aims to provide the broad nanoscience and nanotechnology communities with a brief tutorial on some of

Jan 17, 2026

X-Ray Spectroscopy

3.8 X-ray spectroscopy X-ray spectroscopy is a term used for spectroscopic techniques that use X-ray excitation to study molecules.

Mar 09, 2026

X-ray absorption spectroscopy | Nature Reviews Methods Primers

X-ray absorption spectroscopy is an element-specific and orbital-specific technique that can probe local atomic and

Jul 02, 2026

X-ray fluorescence

A X-ray fluorescence spectrometer with automated sample feed in a cement plant quality control laboratory XRF scanning of the

Jul 19, 2026

X-ray Interpreter: AI-Powered Radiology Interpretation

Access our free online tool to read X-rays, CT scans, MRI, Ultrasounds, and other radiology services quickly and accurately,

Jul 30, 2025

X-Ray Spectroscopy

X-Ray Spectroscopy- Principle, Instrumentation and Applications. X-ray spectroscopy is the techniques for

Feb 15, 2026

X-ray Photoelectron Spectroscopy (XPS)

The energy of the X-rays emitted from the source depends upon the anode material from which they are formed. If Mg

Dec 21, 2025

Interpreting IR Spectra: A Quick Guide – Master Organic Chemistry

In this post, I want to show that a typical analysis of an IR spectrum is much simpler than you might think. In fact,

Aug 15, 2025

X-Ray Spectroscopy

When x-ray hits sample, the sample emits x-rays along a spectrum of wavelengths characteristic of the type of atoms

Sep 05, 2025

X Ray Spectrometers

Energy-dispersive X-ray spectroscopy (EDS/EDX) is defined as an analytical technique used to determine the chemical or elemental

Jan 20, 2026

X-ray absorption spectroscopy for beginners

XAFS can be interpreted as due to scattering of the photo-electron ejected from the absorbing atom by the photo-electric effect.

Jan 03, 2026

X-ray diffraction (XRD) basics and application

The x-rays then pass through the sample, “bouncing” off of the atoms in the structure, and changing the direction of the beam at

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://khanimamboguesthouse.co.za>

Email: sales@khanimamboguesthouse.co.za

Phone: +27 64 852 1973

Address: Unit 7, Greenway Business Park, 8 Innovation Drive, Centurion, 0157,
South Africa

This document is for informational purposes only. Specifications subject to
change without notice.

