

Coating of Microscope Spectrometers



Article Overview

Optical coatings on microscope spectrometers enhance light transmission, reduce reflections, and improve measurement accuracy across specific wavelength ranges.

Purpose of Coatings

Coatings on microscope spectrometers are thin-film layers applied to optical surfaces such as lenses, windows, and mirrors to control how light interacts with these surfaces. Their main functions include:

- Reducing unwanted reflections to increase signal strength and minimize stray light or ghost images.
- Enhancing transmission of specific wavelength ranges to improve detector sensitivity.
- Selective reflection or filtering to isolate desired spectral bands for precise measurements . These coatings are critical in high-precision applications, such as UV-VIS-NIR spectroscopy, imaging, and laser-based microscopy, where even small losses or distortions can affect data quality .

Types of Coatings

- Anti-Reflective (AR) Coatings:
 - Single-layer AR coatings, often using magnesium fluoride (MgF_2), reduce reflections at a target wavelength through destructive interference.
 - Multi-layer AR coatings stack thin films with varying refractive indices to reduce reflections across broader spectral ranges.
 - Nanostructured coatings achieve broadband anti-reflective properties using sub-w...

Article Content

Aug 30, 2025

EM Sample Preparation Coating Technology

Carbon Coating The thermal evaporation of carbon is widely used for preparing specimens for electron microscopy. A carbon source

Nov 02, 2025

Measuring the Thickness of Metal Coatings: A Review of the Methods

Thickness dramatically affects the functionality of coatings. Accordingly, the techniques in use to determine the

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Micro-spectrophotometry

An advantage of the "microscope spectrometer" is its ability to use microscope apertures to precisely control the area of sample

Oct 23, 2025

Spectrometers Systems | High quality process control

Spectrometer systems for large area coatings, food & agricultural industry. Ensuring quality, securing process control and providing

Apr 05, 2026

Nanoscale Surface Metal-Coating Method without Pretreatment for

Biospecimen imaging is essential across various fields. In particular, a considerable amount of research has focused

Jun 04, 2026

Coating Thickness Measurement System

The system is based on white light interference effects caused by reflection from the top and bottom surfaces of the coating. This

Jul 31, 2025

Nondestructive Thickness Determination of Coatings and Layers from

Abstract: This work examines a simplified phase difference model for the thickness measurement of organic coatings and laminates

Aug 03, 2025

Layer thickness determination and layer thickness measurement

We provide you with advice as to which coating thickness measurement method is best suited for your particular problem. Each

Mar 11, 2026

Optical Surface Inspection

Antireflective coatings are required to reduce this, especially when complex optical systems are designed

Aug 17, 2025

Coating Thickness Measurement System

To protect the surface against scratches and yellowing by UV light, it is coated externally in the production process with a protective

Sep 14, 2025

Coating Techniques for SEM and Microanalysis

Nearly all nonconductive specimens examined in the scanning electron microscope or analyzed in an electron probe microanalyzer

Mar 04, 2026

Microscopy Research and Technique | Microscopy Journal | Wiley

Scanning electron microscopy (SEM) studies surface morphology. Biological material needs to be coated to render

Jul 08, 2026

Sample Coating for SEM | JEOL Resources

Modern day Scanning Electron Microscopes (SEMs) are capable of imaging at ultralow voltages or low vacuum

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Nanoscale Surface Metal-Coating Method without Pretreatment for

Schematic of nanoscale surface metal-coating method and bioimaging applications.
2. Materials and Methods 2.1. Materials and

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Sputter Coating

Challenging samples for SEM Scanning electron microscopes (SEMs) are versatile tools that can provide nanoscale

Sep 21, 2025

Measurement Tools for Optical Coatings

Generally, coatings with a set-up-specific operating temperature lower than 100°C can be used for high power applications. Please

Mar 14, 2026

Advances in Optical Manufacturing: Measurement considerations when ...

The image was taken at 200x using a Nomarski microscope. Accurately measuring the performance of an optical thin-film coating

Jan 15, 2026

Introduction to metal coating technology for Electron

This document is to provide insights into the sputter coating sample preparation technique used

Mar 25, 2026

Optical Surface Inspection

Optical Surface Inspection Anti Reflectance Properties of Coatings Comparison coated vs. uncoated lens surfaces. Green: Lens with

Jan 18, 2026

Guide to Raman Microscopy

What is Raman Microscopy? Raman microscopy (μ -Raman) combines the chemical analysis technique,

Aug 08, 2025

Mikroskop Spektroskopie A.S. & Co.

Microscope spectrometer can also be used in the coating of surfaces and the determination of layer

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An Introduction to Optical Coatings

Optical coatings are used to influence the transmission, reflection, or polarization properties of an optical

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Sample Preparation for EM: A Practical Guide to Coating and Freeze ...

From coatings done in a low-vacuum sputter coating machine at room-temperature to those done in high-vacuum and

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Optical Coatings and Their Role in Spectroscope Performance:

Coatings like anti-reflective, bandpass, or edgepass filters help the instrument isolate specific wavelengths and

Oct 12, 2025

Combining Spectroscopy with Microscopy

The microscope and spectrometers are linked via an optical fibre that is coupled to the

Jul 27, 2025

SE-imaging

SE-imaging - coated samples Secondary electron imaging - coated samples This is the most commonly used imaging modality in

Nov 27, 2025

Hard-magnetic coatings for high-precision microscopy

Microscopy is at the forefront of the fight against the coronavirus. Special microscopes, which enable scientists to view

Jan 13, 2026

Sputter Coating

Enhancement of this process for scanning electron microscopy (SEM) sample coating is obtained by the choice of a suitable

Dec 28, 2025

Target Material Selection for Sputter Coating of SEM Samples

Abstract. This article describes target material options for sputter coaters that deposit a thin metal coating on non

Nov 01, 2025

Observation and Measurement of Coating Using a Digital Microscope

This section introduces the difference between plating and coating, the purposes of coating, and the types of coating in addition to

Apr 19, 2026

Coating Techniques for SEM and Microanalysis

Coating Techniques for SEM and Microanalysis 10.1. Introduction Nearly all nonconductive specimens examined in the scanning

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X-ray fluorescence analysis of solid-state films, layers, and coatings ...

Examples of X-ray fluorescence analysis of coating surfaces of simple and complex configurations are presented. The

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H. L. Clausing Inc

Since 1927, H. L. Clausing Inc. has been producing mirrors and optical coatings. Our customers include research, universities,

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Anti-Reflection Coatings Under the Microscope: Tools, Techniques ...

Anti-reflective (AR) coatings are indispensable in optical technology, reducing unwanted reflections and boosting light transmission.

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Confocal Raman microscopy for coatings and thin films

Explore the applications of confocal Raman microscopy for coatings and thin films. Discover

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

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

Email: sales@iiss.co.za

Phone: +27 63 174 2895

Address: Unit 8, Innovation Park, 15 Rivonia Road, Sandton, Johannesburg,
2196, South Africa

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