

Hollow Cathode Lamp Spectrometer



AI Overview

A hollow cathode lamp provides element-specific, monochromatic light essential for accurate atomic absorption spectroscopy measurements.

Function in a Spectrometer

A hollow cathode lamp (HCL) serves as a highly specific light source in atomic absorption spectrometers, emitting light at the exact wavelength that corresponds to the element being analyzed. This specificity is crucial because atomic absorption relies on the principle that atoms absorb light only at their characteristic resonant wavelengths. Using a broad-spectrum or continuum light source would reduce sensitivity and accuracy due to overlapping absorption from other elements.

How It Works

The HCL consists of a glass tube containing a hollow cathode made of the target element, an anode, and an inert buffer gas such as argon or neon. When a voltage is applied:

- The buffer gas is ionized, forming a plasma.
- Positive ions from the gas are accelerated toward the negatively charged hollow cathode.
- These ions sputter atoms from the cathode, creating a vapor of the target element.
- Collisions in the plasma excite these atoms, which then emit monochromatic light as they return to their ground state. This process, known as the hollow cathode effect, enhances emission intensity and allows the lamp to operate at lower voltages with higher current density, producing a strong, clean signal

Article Content

Mar 30, 2026

Hollow-cathode lamp

A hollow-cathode lamp (HCL) is type of cold cathode lamp used in physics and chemistry as a spectral line source (e.g. for atomic

Aug 31, 2025

Spectrolamps

Optogalvanic Lamps Optogalvanic Laser Calibration See-Through Hollow Cathode Lamp with high purity cathode, quartz window,

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AAS – Atomic Absorption Spectrometry

Basics of atomic absorption spectroscopy Atomic absorption spectroscopy is one of the atomic-spectrometric methods that makes

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Hollow Cathode Lamps for iCE™ 3000 Series Atomic Absorption ...

Hollow Cathode Lamps for iCE™ 3000 Series Atomic Absorption Spectrometers. For maximum flexibility from your iCE 3000 Series

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Hollow Cathode Lamps for iCE™ 3000 Series Atomic Absorption ...

For maximum flexibility from your Thermo Scientific™ iCE™ 3000 Series Atomic Absorption spectrometer, a huge range of pre

Nov 06, 2025

How does a hollow cathode lamp work and what is its role in

A hollow cathode lamp works by passing an electric current through a gas-filled tube with a cathode at its center. The

Jul 12, 2026

Hollow Cathode Lamps – Spectrolamps

Hollow Cathode lamps (HCL's) are available in 2 standard sizes, 1.5 inch (37mm) for most instrument

May 04, 2026

Hollow Cathode Lamps: The Complete AAS Guide

Learn all about the hollow cathode lamp and how it works. This guide covers why it's used

Nov 24, 2025

Practical Multi-Element Hollow Cathode Lamps for Atomic ...

Multi-element hollow cathode lamps have traditionally been considered inferior to single-element lamps for spectrochemical analysis

Dec 29, 2025

Spectrolamps

An optogalvanic lamp is a specialised see through hollow cathode discharge lamp designed to utilise the

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Hollow-Cathode Lamps: A Key Component in Atomic Absorption Spectroscopy ...

This lamp is the heart of a widely used analytical technique known as Atomic Absorption Spectroscopy (AAS). Without

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Features and Operation of Hollow Cathode Lamps

A suitable window transmits the light to the spectrometer's optical system. To obtain successful background correction the deuterium

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Hollow Cathode Lamps

Hollow Cathode Lamps Competitive Comparison The hollow cathode lamp is a discharge lamp designed for use as a spectral line

Feb 25, 2026

Atomic Absorption Hollow Cathode Lamps

A hollow cathode lamp is used as a spectral line source for Atomic Absorption (AA) instruments. AAS lamps utilize the hollow

Apr 26, 2026

Hollow-Cathode Lamp

The cathode of the lamp is a hollow cylinder of the metal to be determined. The anode and cathode are sealed in a glass cylinder

Dec 14, 2025

Features and Operation of Hollow Cathode Lamps and Deuterium Lamps

The Hollow Cathode Lamp The primary requirement of a hollow cathode lamp is to generate a narrow emission line of

Nov 17, 2025

10.4: Atomic Absorption Spectroscopy

The emission spectrum for a hollow cathode lamp includes, in addition to the analyte's emission lines,

Aug 26, 2025

HOLLOW CATHODE LAMPS

Hamamatsu provides a full line of hollow cathode lamps developed by our discharge tube manufacturing technology accumulated

Jul 18, 2026

Hollow cathode lamp

Noblelight hollow cathode lamps are available both for OEMs and as a replacement lamp by discerning users the world over. The

Sep 29, 2025

Hollow Cathode Lamps

The hollow cathode lamp is a discharge lamp designed for use as a spectral line source with atomic absorption (AA) spectrometers.

Jan 11, 2026

Hollow-Cathode Lamp for Use in Emission and Absorption

Demountable hollow-cathode lamps have frequent application as sample emission sources in high resolution spectroscopy^{1,2} and as

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