

Copper Smelting Spectrometer



Overview

Only two commercial instruments exist for copper smelters: the Noranda Pyrometer and the Online Production Control (OPC) system. Successful application of optical spectroscopy can enhance real-time monitoring of chemical processes in copper smelting. Continuing this long tradition of excellence, the Thermo Scientific™ ARL iSpark™ 8860 Metal Analyzer is the trusted standard, which also integrates the latest innovations to provide our customers with the optical emission in all possible copper grades. Only two commercial. In this paper, we report on spectral features emitted by a reaction shaft occurring in flash smelting of copper concentrates containing sulfide copper minerals such as chalcopyrite (CuFeS_2), bornite (Cu_5FeS_4) and pyrite (FeS_2). Different combustion conditions are addressed, such as. The distribution coefficients of minor elements Co, Ni, Zn, Pb, Bi, Sn, Sb, As, Te, Se, Ga, Ge, and In between slag, matte, and spinel phases in industrial copper converting slag samples have been determined by the microanalysis method using the combination of electron probe microanalysis (EPMA). The first one is applied to smelting and converting reactors based on the measurements of the radiation of the oxidation of different copper and iron sulfides.



Article Content

May 30, 2026

(PDF) Experimental Investigation and Modelling of Microstructure and ...

Effective extraction of copper from sulphide ores requires careful operation of a copper smelter, which in turn depends very much on chemistry of the feed and resulted slag and matte. For example,

May 25, 2026

Understanding the Copper Smelting Process: A Detailed

Copper Ore Sources and Composition Copper ore plays a pivotal role in the copper smelting process. Understanding the various sources and the specific

Jan 19, 2026

Phase identification of copper concentrate and copper smelting slag

This research was based on the portable X-ray fluorescence spectrometer (XRF) to determine the content of copper and silicon in copper concentrate and its smelting slag.

Sep 19, 2025

Sensors and Process Control in Copper Smelters: A

On-line sensors of important operational variables play a key role in the improvements of operational standards. In copper pyrometallurgy, the degree

Sep 05, 2025

Microanalysis and Experimental Techniques for the Determination of ...

In copper industry, the converting of mattes with high lead content creates a considerable technical difficulties. The lead smelting and refining systems also produce mixed lead -copper

Apr 21, 2026

Simultaneous recovery of arsenic and copper from copper smelting

Recovering arsenic from copper smelting slag (CS) into concentrate by flotation, along with copper, can effectively manage arsenic contamination and r

Jul 19, 2025

Unveiling diverse copper trace element profiles from a

Unveiling diverse copper trace element profiles from a single smelting site through laser ablation-inductively coupled plasma-mass spectrometric analysis

Feb 25, 2026

The application of field imaging spectrometer system(FISS) in ...

During the archaeological study of culture layers, much attention is paid to the filler of the materials. The fired soil (iron oxide) and carbonized substance are the primary targets of interest which are related

Oct 31, 2025

Flash Smelting Copper Concentrates Spectral Emission

A flame-emission spectrometer was built to determine the elemental composition of powdered minerals that are important in copper smelting processes.

Feb 19, 2026

(PDF) Sensors and Process Control in Copper Smelters:

Only two commercial instruments exist for copper smelters: the Noranda Pyrometer and the Online Production Control (OPC) system. Successful application of

Mar 15, 2026

(PDF) Modelling copper smelting - the flash smelting

Numerical modelling has revolutionized copper smelting by integrating chemical reactions and thermodynamics. The Flash Smelting process has scaled from 24

Feb 15, 2026

Characterisation of Secondary Copper Smelting Slag With ...

In this study slag from secondary copper smelting is characterized with transmission electron microscopy in nano-scale. Crystalline spinel phases, amorphous slag matrix and areas

Jun 02, 2026

Experimental Investigation and Modeling of Copper

Disobeying these rules may lead to complications in smelting operation, poor quality of the copper products, and premature shutdown of the

Nov 07, 2025

Optimization of Slag Chemistry for Copper Flash Smelting ...

The phase diagram is essential for optimizing slag compositions for smooth tapping and effective separation of matte and slag in the copper flash smelting process. Increased CaO, MgO,

Jul 16, 2025

EDXRF1457

Scope The analysis of copper in ore is demonstrated, suitable for exploration and ore grade control at the mine site. Background Elemental analysis is crucial for screening samples at the mine site and

Feb 17, 2026

Flash Smelting Copper Concentrates Spectral Emission Measurements

The core of this work is dedicated to identify visible band spectral features, from intensity calibrated spectral measurements, to recognize the proper operation of a flash smelting copper concentrates

Jun 23, 2026

The application of field imaging spectrometer system(FISS) in ...

In the application of FISS in the archeology of ancient copper smelting site, both supervised and unsupervised unmixing and classification techniques can be useful for detecting soil component.

May 15, 2026

Radiometric Methods for High Temperature Flame Estimation:

For this purpose, a radiometric optical system based on a visible to near-infrared (VIS-NIR) spectrometer fit with a specialized method is proposed as a sensor for industrial flash copper

Jun 23, 2026

Analysis of copper with ARL iSpark 8860 Optical Emission Spectrometer

Ultra-fast inclusion analysis ons in copper and its alloys. The inclusion data is obtained by processing the signal spark signals with Spark-DAT (Spark Data Acquisition and Treatment) algorithms.

Apr 21, 2026

Spectroscopic characterisation of feedstock for copper smelters by ...

A flame-emission spectrometer was built to determine the elemental composition of powdered minerals that are important in copper smelting processes. The feedstock, consisting of

Jul 30, 2025

Sensors and Process Control in Copper Smelters: A Review of

We present two types of sensing concept. The first one is applied to smelting and converting reactors based on the measurements of the radiation of the oxidation of different copper and iron sulfides.

Dec 23, 2025

Estimation of Spectral Emissivity and S/Cu Ratio From

Abstract and Figures The project focused on the investigation of new sensing techniques in the copper production industry, specifically in flash

Jan 20, 2026

Energy-Dispersive Spectroscopy Improves Copper

The copper concentrate contains various sulfides of copper and iron, plus smaller concentrations of gold, silver, and other materials. Smelting:

May 21, 2026

Measurement of Minor Element Distributions in Complex Copper

In this study, we determined distribution coefficients of minor elements Co, Ni, Zn, Pb, Bi, Sn, Sb, As, Te, Se, Ga, Ge, and In during an industrial copper converting process between slag, matte, and

Jul 13, 2025

Flash Smelting Copper Concentrates Spectral Emission Measurements

In this paper, we report on spectral features emitted by a reaction shaft occurring in flash smelting of copper concentrates containing sulfide copper minerals such as chalcopyrite (CuFeS_2),

Jan 14, 2026

An efficient approach to utilize copper smelting slag: Separating ...

Over 50 million tons of copper slag are produced worldwide annually. Stacking is currently the primary method used to treat copper slag, resulting in

Jun 26, 2025

Optimization of portable X-ray fluorescence spectrometry for the ...

Purpose Copper (Cu) is the earliest anthropogenic metal pollutant, but knowledge of Cu soil concentrations at ancient metalworking sites is limited. The objective of this work was to examine

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