International Standard

ISO 24181-1

First edition
2024-08

Rare earth — Determination of non-rare earth impurities in individual rare earth metals and their oxides — ICP-AES —

Part 1: Analysis of Al, Ca, Mg, Fe and Si

Terres rares — Détermination des impuretés de terres non rares dans les métaux de terres rares individuels et leurs oxydes — ICP-AES —

Partie 1: Analyse de Al, Ca, Mg, Fe et Si

Reference number
ISO 24181-1:2024(en)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 298, *Rare earth*.

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Introduction

Atomic spectroscopy has been recognised as the most common technique for trace elemental determinations. Although atomic absorption spectroscopy is limited to determination of one element at a time, many elements are analysed routinely at the same time by inductively coupled plasma atomic emission spectroscopy (ICP-AES), which utilises the inductively coupled plasma (ICP) as an excitation source for atomic emission spectrometry (AES). Several thousands of these instruments are in routine use throughout the world.

ICP-AES is the most common technique for trace elemental determinations, particularly for the analysis of impurities. This method has been demonstrated to feature a linear response over a wide dynamic range, a low chemical interference/matrix effect, good stability and good reproducibility. It demonstrates a low detection limit and various sample introduction techniques are available for different sample analysis demands.

In rare earth metals and oxides, during processing ores of rare earth elements, Aluminum(Al), calcium(Ca), magnesium(Mg), iron(Fe) and silicon(Si) are contained as impurities. ICP-AES is well-suited for the quantification of non-rare earth impurities in a matrix containing rare earth elements. Additionally, the ICP-AES technique also offers high resolution for rare earth elements as rare earth elements exhibits line-rich emission spectra.

This document provides a guide for chemical analysis of materials for producers, consumers, and traders in the field of rare-earth metals and their oxides. This document is anticipated to reduce discrepancies caused by inconsistencies in the analytical procedures used when working with rare earth metals and their oxides.