

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 2434.9—2000

Methods for the analysis and testing of lower rank coal and its chars

Method 9: Determination of four acid-extractable inorganic ions in lower rank coal

RECONFIRMATION NOTICE

Technical Committee MN-001 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 15 July 2013.

The following are represented on Technical Committee MN-001:

Australasian Institute of Mining and Metallurgy
Australian Coal Association
Australian Coal Industry Reference Samples
Australian Coal Preparation Society
Bureau of Steel Manufacturers of Australia
Coalfield Geology Council of NSW
CSIRO Energy Technology
National Association of Testing Authorities Australia
National Generators Forum
The University of New South Wales
The University of Queensland
University of Newcastle

NOTES

Australian Standard™

AS 2434.9

Methods for the analysis and testing of lower rank coal and its chars

Part 9: Determination of four acid-extractable inorganic ions in lower rank coal

PREFACE

This Standard was prepared by the Standards Australia Committee MN/1, Coal and Coke to supersede AS 2434.9—1991, *Methods for the analysis and testing of lower rank coal and its chars*, Part 9: *Determination of four acid-extractable inorganic ions in lower rank coal*.

This Standard differs from the previous edition in mentioning an ICP-AES method as an alternative to the AAS method.

FOREWORD

The elements sodium, calcium, iron and magnesium are commonly found in lower rank coal. They can contribute significantly to coal utilization problems such as boiler tube fouling and ash disposal; they also affect product quality and gaseous emissions from combustion processes.

The concentrations of these elements, and other elements commonly found in lower rank coal, are determined by a variety of methods. This Standard presents a relatively simple method for the determination of their acid-extractable components.

In order to obtain the greatest benefit from determinations such as those described in this Standard, a thorough understanding of the precise nature and various forms of the inorganic species present is necessary.



METHOD

1 SCOPE

This Standard sets out a method for the determination by atomic absorption spectrometry of the concentrations of the acid-extractable ions sodium, magnesium, calcium and iron in coal. The method is applicable to any coal, but a meaningful interpretation of results can only be gained if the forms of the inorganics in the coal are known.

NOTES:

- 1 The determination of acid-extractable aluminium is also possible by this method. Aluminium is found in most coals in various forms of clays, but can also be present in some coals in an acid-extractable form, thought to be best represented as $\text{Al}(\text{OH})_n^{(3-n)+}$. Aluminium in some clay types is partially soluble in acid. A detailed understanding of the mineral and inorganic constituents of the coal is necessary before acid-extractable aluminium determinations are performed.

These considerations apply also to the other inorganic ions, but to a lesser extent.

- 2 An alternative procedure for measurement of the concentrations of the ions using inductively coupled plasma atomic emission spectrometry (ICP-AES) is acceptable if it can be demonstrated that the procedure has the same precision and accuracy as the atomic absorption technique used in this method.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

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| 1038 | Coal and coke—Analysis and testing |
| 1038.16 | Part 16: Assessment and reporting of results |
| 1152 | Specification for test sieves |
| 2134 | Recommended practice for chemical analysis by atomic absorption spectrometry |
| 2134.1 | Part 1: Flame atomic absorption spectrometry |
| 2243 | Safety in laboratories (series) |
| 2434 | Methods for the analysis and testing of lower rank coal and its chars |
| 2434.7 | Part 7: Determination of moisture in the analysis sample of lower rank coal |
| 2508 | Safe storage and handling information card (series) |
| 2706 | Numerical values—Rounding and interpretation of limiting values |

3 PRINCIPLE

The analysis sample is extracted with hot hydrochloric acid after wetting of the coal with alcohol. Any forms of sodium, magnesium, calcium, iron (and aluminium) that are exchangeable or extractable with the hydrochloric acid, are extracted from the coal. After removal of the residual coal by filtration, the concentrations of the elements in the filtrate are determined by atomic absorption spectrometry.

4 SAFETY

For information on laboratory safety, reference should be made to the relevant parts of AS 2243 and AS 2508.