

Australian Standard™

**Coal and coke—Analysis and testing**

**Part 14.1: Higher rank coal ash and  
coke ash—Major and minor elements—  
Borate fusion/flame atomic absorption  
spectrometric method**

This Australian Standard was prepared by Committee MN-001, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 22 September 2003 and published on 14 November 2003.

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The following are represented on Committee MN-001:

Australasian Institute of Mining and Metallurgy  
Australian Building Codes Board  
Australian Coal Association  
Australian Coal Preparation Society  
Australian Institute of Energy  
Coalfield Geology Council of N.S.W  
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## PREFACE

This Standard was prepared by the Standards Australia Subcommittee MN-001-01, Coal Evaluation, under the supervision of Committee MN-001, Coal and Coke, as a revision of AS 1038.14.1—1995, *Coal and coke—Analysis and testing, Part 14.1: Higher rank coal ash and coke ash—Major and minor elements—Borate fusion/flame atomic absorption spectrometric method*.

This Standard provides an alternative digestion procedure to AS 1038.14.2, *Coal and coke—Analysis and testing, Part 14.2: Higher rank coal ash and coke ash—Major and minor elements—Acid digestion/flame atomic absorption spectrometric method*.

The objective of this Standard is to provide those responsible for the analysis of coal ash and coke ash with a uniform method for the procedure.

This Standard confirms the procedure for determining major and minor elements in higher rank coal ash and coke ash by the borate fusion/flame atomic absorption method and has been editorially updated to the current format.

## CONTENTS

	<i>Page</i>
1 SCOPE .....	4
2 REFERENCED DOCUMENTS .....	4
3 DEFINITIONS .....	5
4 PRINCIPLE .....	5
5 SAFETY .....	5
6 REAGENTS .....	5
7 APPARATUS .....	7
8 SAMPLE PREPARATION .....	8
9 PROCEDURE .....	8
10 CALCULATION .....	12
11 REPORTING OF RESULTS.....	13
12 PRECISION .....	13
13 TEST REPORT .....	13

## STANDARDS AUSTRALIA

## Australian Standard

## Coal and coke—Analysis and testing

Part 14.1: Higher rank coal ash and coke ash—Major and minor elements—  
Borate fusion/flame atomic absorption spectrometric method**1 SCOPE**

This Standard sets out a method for the determination of silicon, aluminium, iron, calcium, magnesium, sodium, potassium, titanium, manganese, barium, strontium and zinc in higher rank coal ash and coke ash by flame atomic absorption spectrometry after borate fusion. A spectrophotometric method for the determination of phosphorus and a method for the determination of sulfur are also referenced.

This method is suitable for the determination of the above elements (expressed as oxides), in the concentration ranges specified in Table 1.

**TABLE 1**  
**CONCENTRATION RANGES**

Element	Reported as oxide	Range, percent		
Silicon	SiO <sub>2</sub>	20	to	85
Aluminium	Al <sub>2</sub> O <sub>3</sub>	1.0	to	70
Iron	Fe <sub>2</sub> O <sub>3</sub>	0.05	to	40
Calcium	CaO	0.05	to	40
Magnesium	MgO	0.05	to	40
Sodium	Na <sub>2</sub> O	0.05	to	10
Potassium	K <sub>2</sub> O	0.01	to	6
Titanium	TiO <sub>2</sub>	0.01	to	12.5
Manganese	Mn <sub>3</sub> O <sub>4</sub>	0.005	to	1
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.01	to	5
Sulfur	SO <sub>3</sub>	0.1	to	15
Barium	BaO	0.01	to	2.5
Strontium	SrO	0.01	to	0.5
Zinc	ZnO	0.01	to	0.5

**2 REFERENCED DOCUMENTS**

The following documents are referred to in this Standard:

AS

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|------------|--|
| 1038       | Coal and coke—Analysis and testing   |
| 1038.3     | Part 3: Proximate analysis of higher rank coal   |
| 1038.4     | Part 4: Coke—Proximate analysis  |
| 1038.6.3.2 | Part 6.3.2: Higher rank coal and coke— Ultimate analysis—Total sulfur—<br>High-temperature combustion method |