Australian Standard™

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

Standards Australia

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PREFACE

This Standard was prepared by the Standards Australia Subcommittee MN-00-01, Coal Evaluation, under the supervision of Committee MN-001. Coal and Coke, as a revision of AS 1038.14.2—1995, *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*. It is a companion to AS 1038.14.1, *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.*

Part 14.1 specifies decomposition of the ash by borate fusion. This Standard sets out a bomb digestion procedure using a hydrochloric acid/hydrofluoric acid mixture for the decomposition of coal ash and coke ash, followed by flame atomic absorption spectrometry for the determination of various elements in the ash.

By convention, sulfur is included in the normal ash constituent analysis.

Phosphorus could be also determined spectrophotometrically in the solution prepared from the ash. Sulfur can be determined by the high temperature procedure.

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.

The term ‘informative’ is used in this Standard to define the application of the Appendix to which it applies. An informative Appendix is for information and guidance only.

This Standard confirms the method of determining major and minor elements by the acid digestion/flame atomic absorption spectrometric method and has been editorially updated to the current format.

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1 SCOPE

This Standard sets out methods for the determination of silicon, aluminium, iron, calcium, magnesium, sodium, potassium, titanium and manganese in higher rank coal ash and coke ash by flame atomic absorption spectrometry after acid digestion.

NOTE: Although a volumetric approach has been specified for solution preparation, a gravimetric alternative may be used.

A spectrophotometric method for the determination of phosphorus and a method for the determination of sulfur are also referenced.

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

Table 1 has been devised to accommodate any type of ash that is likely to arise from Australian higher rank coals or cokes.

NOTE: The results in Appendix A have been obtained from test work carried out on the available samples. Although testing was not carried out with a comprehensive range of likely coal compositions, the method is expected to apply over the wider ranges covered by the calibration standards and indicated in Table 1.

TABLE 1

CONCENTRATION RANGES

Element	Reported as oxide	Range, %
Silicon	SiO_2	20 to 85
Aluminium	Al_2O_3	10 to 50
Iron	Fe_2O_3	0.1 to 15
Calcium	CaO	0.5 to 25
Magnesium	MgO	0.5 to 25
Sodium	Na_2O	0.5 to 12.5
Potassium	K_2O	0.05 to 12.5
Titanium	TiO_2	0.1 to 5
Manganese	Mn_3O_4	0.005 to 0.6
Phosphorus	P_2O_5	0.01 to 5
Sulfur	SO_3	0.1 to 10

