AS 3685—1998
Reconfirmed 2016

Australian Standard®

Recommended procedures and principles of glow discharge mass spectrometry (GD-MS)

This Australian Standard was prepared by Committee CH/16, Spectroscopy. It was approved on behalf of the Council of Standards Australia on 15 October 1997 and published on 5 January 1998.

The following interests are represented on Committee CH/16:

Australian Chamber of Commerce and Industry

CSIRO, Division of Coal and Energy Technology

CSIRO, Division of Material Science and Technology

Department of Defence (Australia)

National Association of Testing Authorities Australia

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 3685—1998
Recommended procedures and principles of glow discharge mass spectrometry (GD-MS)

RECONFIRMATION NOTICE

Technical Committee CH-016 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.

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PREFACE

This Standard was prepared by the Standards Australia Committee CH/16, Spectroscopy.

The guidelines given in this Standard are intended primarily for the development and application of a standard method which may be applied less rigidly in ordinary routine operation of glow discharge mass spectrometry. The guidelines are intended to be of general applicability, and not restricted to a given class of materials.

The standard practice of specifying instrumental suitability in terms of fundamental performance criteria is described. The quality of results obtainable from a given instrument can depend markedly on its optimization and correct operation.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

CONTENTS

Page

STANDARDS AUSTRALIA

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard is a guide to the operation and recommendations for the use of glow discharge mass spectrometry (GD-MS).

NOTES:

1 This Standard should be read in conjunction with the instrument manufacturer's recommendations.

2 The general safety precautions listed in Appendix A and in AS 2243.1 and AS 2243.2 should be followed to minimize safety hazards.

1.2 PRINCIPLE In a glow discharge source electrical power is supplied between the sample (cathode) and the anode by a power supply typically operated at 0.5 to 2 kV and 1 to 30 mA. Argon (or neon, helium, nitrogen or oxygen) is introduced into the cell, and the pressure near the cathode surface is regulated to a few hundred pascals (Pa). The potential difference between the cathode and the anode extracts electrons from the cathode, causing ionization of the gas and the creation of a plasma (negative glow). Sample atoms which are sputtered by fast ions and neutrals diffuse into the plasma.

Ions formed in the glow discharge are extracted from the cell and pass into a mass spectrometer. The mass spectrometer is scanned and ions are sequentially transmitted to the detector. The ion current reaching the detector is measured for each isotope in turn and this information is stored in the computer system. Elemental concentrations are calculated by the instrument software using these ion currents, by comparison with those arising from the corresponding isotopes of reference materials.

1.3 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS
1894 Code of practice for the safe handling of cryogenic fluids
1940 The storage and handling of flammable and combustible liquids
2243 Safety in laboratories
2243.1 Part 1: General
2243.2 Part 2: Chemical aspects
2243.5 Part 5: Non-ionizing radiations
2865 Safe working in a confined space

ISO
3696 Water for analytical laboratory use—Specification and test methods

1.4 DEFINITIONS For the purpose of this Standard, the definitions below apply.

1.4.1 Abundance sensitivity—the contribution to peak intensity from the tail of a peak at an adjacent mass.